Draft
Environmental Impact Statement
August 1981

La Sal Pipe Line Company Shale Oil Pipeline

Department of the Interior
Bureau of Land Management

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

COLORADO STATE OFFICE
2000 ARAPAHOE ST.
DENVER, COLORADO 80205

IN REPLY REFER TO

CO-922
1792
C-30969

Dear Reviewer:

This draft environmental impact statement (EIS) on the proposed La Sal Oil Shale Pipeline project is submitted for your review and comment. The basis of the final EIS will be the substantive comments received on the draft. If the results of this review do not cause significant changes in the proposed action, alternatives or impact analyses, an abbreviated final EIS may be prepared. Please keep this draft EIS for reference in case an abbreviated final EIS is prepared.

All written comments should be received no later than October 9, 1981, at the address shown on the cover sheet. Comments received after this date may be considered in the preparation of the final EIS but may not be included in the set of comments reproduced for the final EIS.

Comments should be as specific as possible, addressing the adequacy of the scope of the EIS or the impact analyses of the proposed action and alternatives. The purpose of the comment period is to improve the analyses. If the methods used to predict impacts are considered inadequate, the reviewer's comments should describe the rationale and procedures for the preferred methods.

A series of public hearings (see page xiii and xiv) will be held to receive comments on the draft EIS. A copy of the final will be sent to all who provide substantive comments on the draft EIS or who request a copy.

This draft incorporates a number of other documents by reference. The locations of these documents are noted in the literature cited section of the appendices. All referenced documents are reasonably available or may be made available on request. Supporting technical and background reports may be obtained from the address shown on the cover sheet.

Sincerely yours,

George C. Francis
State Director

Enclosure
As stated

DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

DRAFT ENVIRONMENTAL IMPACT STATEMENT

ON THE

LA SAL PIPELINE COMPANY SHALE OIL PIPELINE

PREPARED BY

BUREAU OF LAND MANAGEMENT (LEAD AGENCY)

AND WOODWARD-CLYDE CONSULTANTS

AUGUST 1981

Lyle C. Franz

COLORADO STATE DIRECTOR

COVER SHEET

La Sal Pipeline Company
Shale Oil Pipeline
Environmental Impact Statement

(X) Draft ( ) Final

Lead Agency

U.S. Department of the Interior, Bureau of Land Management

Cooperating Agencies

U.S. Department of the Interior
Fish and Wildlife Service

U.S. Department of the Army
Corps of Engineers

Abstract

This EIS assesses the environmental effects of granting a 320-mile right-of-way to construct a proposed 16-inch shale oil pipeline from the vicinity of Parachute, Colorado, to Casper, Wyoming. The proposed pipeline would contain a 12-inch lateral pipeline from the main trunkline to Rangely, Colorado. The purpose of the project would be to transport upgraded shale oil from the Piceance Basin to existing crude oil transportation facilities at Rangely, Colorado, and Casper, Wyoming. Alternatives assessed include: alternate routes for the main trunkline at river crossings, alternate routes for the Rangely lateral line, and denial of the right-of-way (no action). The key issues raised in the scoping process which this draft EIS concentrates on are: biological and hydrological effects of river crossings, effects of river crossings, effects to wildlife and habitat, probabilities and effects of ruptures and spills, and economic and social effects of construction. Affected counties in Colorado would include Garfield, Rio Blanco, and Moffat counties; those in Wyoming include Carbon, Sweetwater, and Natrona counties.

EIS Contact

Questions and comments on this EIS should be directed to:

James Dean, EIS Coordinator
Bureau of Land Management
Colorado State Office
2000 Arapahoe Street
Denver, Colorado 80205

Phone: Commercial: (303) 837-6017 FTS: 327-6017

Date by Which Comments Must be Received: October 9, 1981 for inclusion in the final EIS.

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

PUBLIC HEARINGS INFORMATION

General Information Regarding the Public Hearings
of the Draft La Sal Pipeline Company Shale Oil Pipeline
Environmental Impact Statement

Authority

The hearings are held pursuant to the objectives of the National Environmental Policy Act (PL 91-190; 83 Stat. 852, 853).

Purpose

The purpose of the public hearings is to receive comments on the scope of the EIS and the adequacy of the impact analyses of the proposed action and alternatives. Comments received at these hearings will be considered in the preparation at the final environmental impact statement.

Composition of the Hearing Panel

The hearings will be conducted by an official of the Bureau of Land Management. Accompanying the official will be a representative of the consulting firm (Woodward-Clyde Consultants) and the BLM review team for this project. The official or panel members may ask questions of the person giving comments in order to clarify points in the comments. All comments and proceedings of the hearing will be recorded.

Oral Statements

Persons wishing to present oral comments will be limited to ten (10) minutes. Written submissions will be accepted from anyone attending the hearing.

All persons wishing to present oral comments must register in advance either by mail to the address of the cover sheet or at the registration desk of the public hearing. Advance registration by mail may be done up to one week prior to the date of the public hearing. Those requesting advance registration by mail should include their name, address, organization represented (if any), and the location of the hearing comments will be presented. All persons giving oral comments must state their name and address for the hearing record.

After the last person who signed up to present oral comments has been heard, the conducting official will ask if there are any other persons who wish to give oral comments. After all oral comments have been presented and recorded the hearing will be closed.

Locations, Times, Dates of Hearings

September 14, 1981 - 7:00 P.M. Meeker, Colorado	Public Library
September 15, 1981 - 7:00 P.M. Craig, Colorado	Moffat County Courthouse
September 16, 1981 - 7:00 P.M. Cheyenne, Wyoming	Holiday Inn
September 17, 1981 - 1:00 P.M. & 7:00 P.M. Denver, Colorado	Denver Marina Hotel

SUMMARY

La Sal Pipe Line Company (the applicant) proposes to construct 279 miles of 16-inch common carrier pipeline and related facilities to transport upgraded shale oil from the Roan Plateau, north of Parachute, Colorado, to Casper, Wyoming, with a 12-inch spur to Rangely, Colorado. From Casper, shale oil or refined products could be transported through existing pipelines to a variety of destinations in the Midwest. From Rangely, the oil could move through existing pipelines in Colorado and Wyoming, or to the Salt Lake City, Utah area.

In response to La Sal Pipe Line Company's right-of-way grant application to the Bureau of Land Management (BLM), Colorado State Office (CSO) (Application Number C-30969, filed November 3, 1980), the CSO was designated Lead Agency. The BLM Colorado State Director is responsible for the preparation of this Environmental Impact Statement (EIS) in accordance with the provisions of the National Environmental Policy Act (NEPA) and the regulations of the Council on Environmental Quality (CEQ).

The purpose of the proposed pipeline is to transport upgraded shale oil from a source location to existing transportation systems. The initial capacity of the pipeline would be approximately 50,000 barrels per day (BPD). If warranted, the system could have a larger capacity with the addition of intermediate pump stations. The proposed project would provide shippers with decision flexibility for destination and delivery scheduling and allow for redistribution or exchange of the oil in response to market conditions. Since the proposed pipeline would be a common carrier, the ultimate use and destination of the shale oil would be determined by prospective shippers.

In compliance with NEPA (40 CFR 1501.7), a public scoping process was conducted in the early stages of preparing this EIS. The scoping process consisted of ten public meetings and numerous contacts with affected agencies. During this process, the scope of issues to be analyzed and significant issues related to the proposed action were identified. A screening process was used to select reasonable alternatives to the proposed action. Of those considered, five alternatives were selected for detailed analysis--two alternative routings for the Rangely Lateral, two partial reroutings of the proposed trunkline, and the No Action Alternative (defined as BLM denial of a permit to the applicant for construction and operation of the proposed action).

The two Rangely lateral routes were analyzed as alternatives pending a decision by the applicant as to which route would be preferred for inclusion in the proposed action. The Southern Rangely Lateral Alternative (41 miles) would depart the proposed trunkline at milepost (MP) 21.75, while the Northern Rangely Lateral Alternative (35 miles) would depart it at MP 36.5. The White River Alternative (16 miles) would depart the proposed trunkline at MP 34.5 and rejoin it at MP 42.25. The Yampa River Alternative (38 miles) would depart the proposed trunkline at MP 49.5 and rejoin it at MP 86. The latter alternative would require relocation of one proposed pump station.

Construction, operation and maintenance of the following project components were considered in impact analysis:

1. 279 miles of 16-inch outside diameter (O.D.) trunkline

2. Either 35 or 41 miles of 12 3/4-inch O.D. lateral pipeline

3. One electric motor-driven pump station for initial transportation of 50,000 BPD

4. Three intermediate electric motor-driven pump stations to attain an ultimate capacity of 150,000 BPD for the proposed trunkline

5. Four storage tanks

6. Below-ground gate valves and above-ground scraper traps

7. Cathodic protection systems

8. Right-of-way markers

The EIS consists of four chapters, as well as Appendices which include a description of consultation and coordination, frameworks for analysis, a glossary of terms, references, an index and location maps. Chapter One describes project need and purpose. Chapter Two describes the proposed action and alternatives, and authorizing actions. Chapter Three describes those components of the affected environment for which potentially significant impacts were identified. Chapter Four describes the potential environmental consequences of the proposed action and alternatives, and addresses mitigation and monitoring.

A fundamental approach to this EIS is reflected in Chapter Two (Proposed Action and Alternatives). Numerous construction methods and resource considerations are incorporated as a part of the proposal. Implementation of these procedures for construction, operation and maintenance was assumed for the purpose of impact analysis. Inclusion of these applicant-proposed considerations and practices, in part, accounts for the relatively low number and magnitude of significant environmental impacts.

Detailed impact analyses were conducted for the following resources and topics:

- Climate
- Air Quality
- Geology (geologic hazards)
- Mineral Resources
- Paleontology
- Soils
- Water Resources (including 100-year Floodplains)
- Vegetation (including Threatened and Endangered Species)
- Wildlife (including Threatened and Endangered Species)
- Wild Horses
- Cultural Resources
- Visual Resources
- Noise
- Land Uses
  - -Agriculture (including Forests and Prime and Unique Farmlands)
  - -Livestock Grazing
  - -Recreation
  - -Wilderness
- Land Use Controls and Constraints
- Transportation
- Social and Economic Conditions
- Energy Use
- Oil Spills

Potentially significant adverse impacts were identified for the proposed action in the areas of Vegetation, Wildlife, Visual Resources, and Social and Economic Conditions. Unknown impacts for the trunkline were identified for Paleontology, Cultural Resources, Threatened and Endangered Species, Prime and Unique Farmlands, and Spill Effects. All other resource analyses produced findings of no impact or no significant impact. These analyses and their findings are documented in Background

Reports which are on file at the BLM Colorado and Wyoming State offices and the following BLM District offices: Grand Junction, Craig, Rawlins, and Casper.

Comparison of potential impacts for each set of alternatives resulted in the following findings:

Comparison One: Southern Rangely Lateral (AB) versus Northern Rangely Lateral (DEB)

Only 7 percent of the Southern Rangely Lateral would be located near existing utilities, versus 66 percent of the Northern Rangely Lateral. In addition, construction of the Southern Rangely Lateral would result in:

- Disturbance of six additional miles or 73 additional acres
- Potentially significant impact to mule deer critical winter range
- Potentially significant impact to eight additional miles of visual resources, and one additional VRM Class II creek or river crossing

Comparison Two: Proposed Trunkline White River Segment (CDF) versus White River Trunkline Alternative (CEF)

Although construction of the White River Trunkline Alternative would result in disturbance of five additional miles or 61 acres more than the Proposed Trunkline segment, other potential environmental consequences were found to be similar.

Comparison Three: Proposed Trunkline Yampa River Segment (GI) versus Yampa River Trunkline Alternative (GHI)

The Proposed Trunkline Yampa River Segment would cause potentially significant impacts to vegetation and wildlife that would be avoided by the Yampa River Trunkline Alternative.

Based on these findings, the Agencies' Preferred Alternative for Comparison Three is the Yampa River Trunkline Alternative (GHI). For Comparison Two, the Agencies' Preferred Alternative is a combination of segments from the Proposed Trunkline and the White River Trunkline Alternative.

While this analysis indicates that the Northern Rangely Lateral would result in fewer significant environmental impacts than the Southern Rangely Lateral Alternative, the Southern Rangely Lateral Alternative was selected by the BLM as the Preferred Alternative for Comparison Three. This is because the Southern Rangely Lateral is closer to known potential sources of shale oil; therefore, it would be more accessible to future users and would require less additional future ROW disturbance for connecting pipelines.

CHAPTER ONE
NEED AND PURPOSE

INTRODUCTION

La Sal Pipe Line Company (the applicant) of Houston, Texas, proposes to construct approximately 279[a] miles of 16-inch common carrier pipeline and related facilities from the Roan Plateau, 17 miles north of Parachute, Colorado, to Casper, Wyoming, and a spur to Rangely, Colorado. The goal of the project is to carry upgraded shale oil to existing oil transportation systems. From Casper, shale oil or refined products could be transported through existing pipelines to a variety of destinations in the Midwest. From Rangely, the oil could move through existing pipelines in Wyoming and Colorado, or to the Salt Lake City, Utah area.

La Sal Pipe Line Company is currently wholly owned by Exxon Pipeline Company (EPC), which is wholly owned by Exxon Corporation. La Sal Pipe Line Company was formed by Atlantic Richfield Company and owned by them until September 22, 1980, when it was purchased by Exxon Pipeline Company.

On November 3, 1980, under Application Number C-30969, La Sal Pipe Line Company applied to the Bureau of Land Management (BLM) for a right-of-way (ROW) grant. The BLM Colorado State Office (CSO) was designated Lead Agency and the BLM Colorado State Director is responsible for the preparation of this Environmental Impact Statement (EIS) in accordance with the provisions of the National Environmental Policy Act (NEPA) and the regulations of the Council on Environmental Quality (CEQ). The Colorado State Director would issue all initial grants, permits, and amendments thereto for federal lands in Colorado, and the Wyoming State Director would issue same for federal lands in Wyoming.

NEED AND PURPOSE

The United States now imports approximately 40 percent of its petroleum requirements. Much of this demand for oil products occurs in the Midwest where there is presently a declining crude oil production (DOE 1980). In addition, anticipated shale oil production in northwestern Colorado, far in excess of local demand, will require a high-volume method of transporting the shale oil into other areas of the United States where the demand is greater. At present there is no organized, high-volume means of transporting shale oil from the source area.

The purpose of the proposed pipeline is to provide a reliable and economical means of transporting upgraded shale oil from a source location to existing transportation systems. The initial capacity of the pipeline would be approximately 50,000 barrels per day (BPD). If warranted, the system could have a larger capacity with the addition of intermediate pump stations. The Rangely lateral would transport the upgraded shale oil to interconnecting pipeline carriers at Rangely, Colorado (at the Chevron pump station) where subsequent shipment could be made to existing refineries through any of several existing pipeline systems. The proposed trunkline to Casper, Wyoming would interconnect with the existing Platte Pipeline Company systems, which could transport the oil to local refineries for processing or to other existing pipelines for distribution to Cheyenne, Denver, Chicago, or St. Louis. The proposed project would provide shippers with decision flexibility for destination and delivery scheduling and allow

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[a]Mileages have been rounded to the nearest whole mile.

for redistribution or exchange of the oil in response to market conditions. The shippers could use the crude oil at one destination or sell the oil for use at other destinations. Since the proposed pipeline would be a common carrier, the ultimate use and destination of the shale oil are unknown and would be determined by discretionary decisions by prospective shippers.

CHAPTER TWO
PROPOSED ACTION AND ALTERNATIVES

PROPOSED ACTION

Initial Siting Considerations

As summarized in Table 2-1, the proposed trunkline would directly affect during construction approximately 3382 acres and during operation 1691 acres of federal, state, and private lands. Construction and operation of the four pump stations associated with the proposed trunkline would directly affect an additional 19 acres of land. In addition to the proposed trunkline, a 12-inch lateral pipeline to Rangely, Colorado (either 35 or 41 miles) is proposed. The location of the lateral is under consideration as one of two alternative routes which are discussed in a following section. The buried pipeline would not traverse any lands under the jurisdiction of the National Park Service (NPS), i.e., National Parks and National Monuments, or lands in trust for an Indian or Indian Tribe. No existing or proposed NPS, Forest Service RARE II or Wilderness Study Areas would be crossed. In accordance with the Federal Land Policy and Management Act of 1976, the proposed action would follow existing pipelines for approximately 66 percent of its length.

Project Components

Map 2-1 shows the general location of the proposed trunkline. Specific locational details (topography, towns, land status, etc.) are shown on Maps 1 to 6 in Appendix F. The precise ultimate capacity of the proposed project is not known at this time. For purposes of this analysis, however, an ultimate capacity of 150,000 BPD was assumed. In the environmental analysis, the eight components described below were considered for construction, operation, and maintenance of the proposed project:

1. 279 miles of 16-inch outside diameter (O.D.) trunkline.

2. Either 35 or 41 miles of 12-3/4 inch O.D. lateral pipeline (Discussed in Alternatives Section).

3. One electric motor-driven pump station would be needed initially for transportation of 50,000 BPD (see Figures 2-1 and 2-2 for pump station details). One 120,000-barrel (bbl) tank would be located within the pump station boundary. The station would be located in Garfield County in the vicinity of Parachute Creek (Map 1, Appendix F). Electrical service and telephone lines would be installed at the pump station. The pump station may require a microwave tower.

4. Three intermediate electric motor-driven pump stations would be needed ultimately to attain a capacity of 150,000 BPD for the 16-inch pipeline to Casper, Wyoming. Approximate locations for these stations are shown in Table 2-2. Figure 2-3 illustrates typical pump station details. Electrical service and leased telephone lines or a microwave tower would be installed at each of the pump stations.

5. One storage tank (120,000 bbl) would be located within the existing pump station at Rangely; and two tanks of this size would be located within Platte's existing tank farm at Casper. The colors for tanks would be either white or aluminum, they would be equipped with internal floating pan roofs, and would have overflow berms or "firewalls".

6. Between 31 and 40 below-ground gate valves would be installed along the

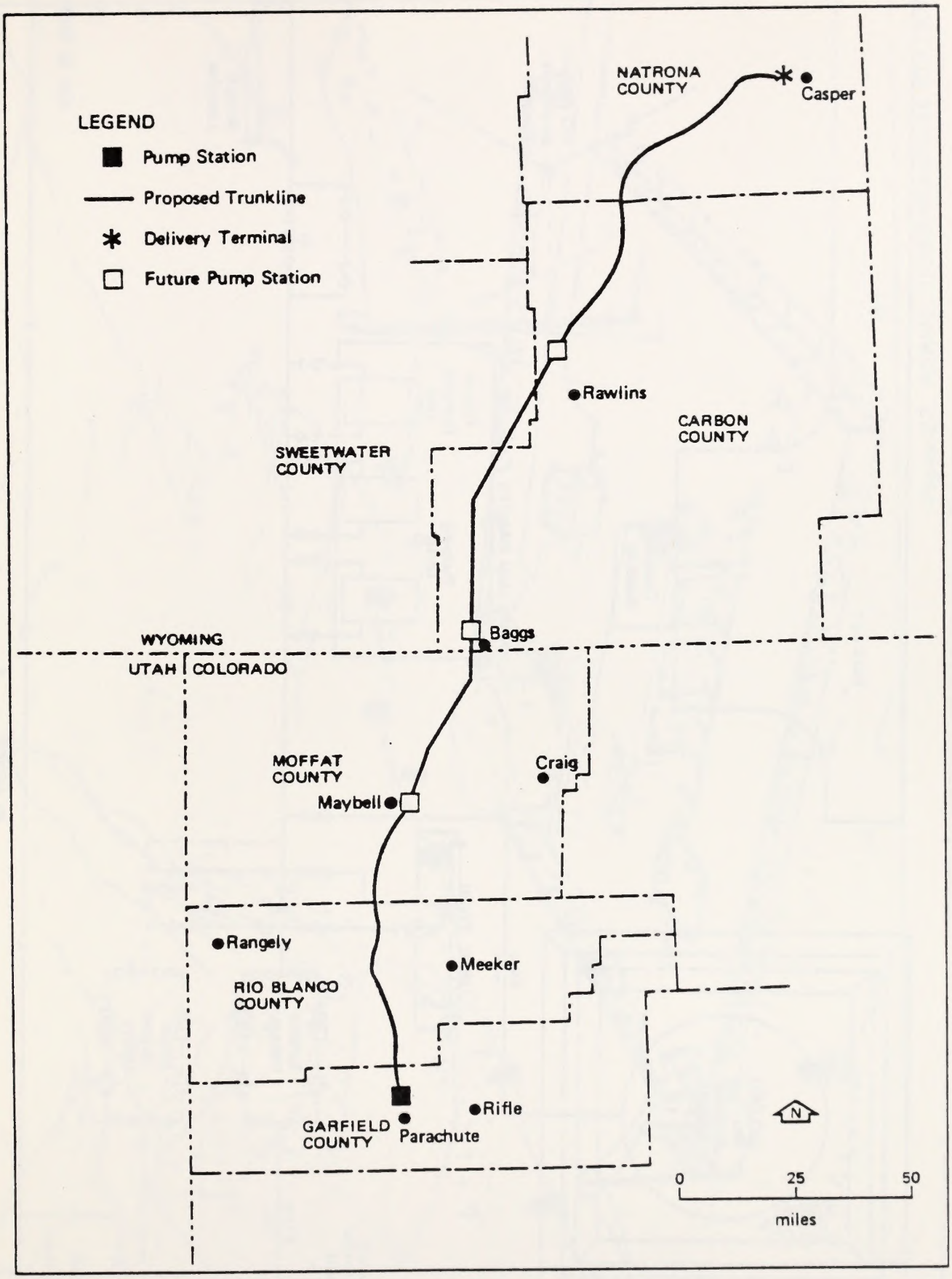
Table 2-1. OWNERSHIP OF LANDS AFFECTED BY PROPOSED TRUNKLINE

STATES Counties	BLM			STATE			PRIVATE			TOTAL		
	Miles	Construction Acreage[a]	Operational Acreage[b]	Miles	Construction Acreage[a]	Operational Acreage[b]	Miles	Construction Acreage[a]	Operational Acreage[b]	Miles	Construction Acreage[a]	Operational Acreage[b]
COLORADO												
Garfield	3	36	18	-0-	-0-	-0-	3	36	18	6	72	36
Rio Blanco	30	364	182	4	49	24	7	85	42	41	498	248
Moffat	20	242	121	9	109	55	34	412	206	63	763	382
WYOMING												
Carbon	61	739	370	10	121	61	34	412	206	105	1272	637
Sweetwater	8	97	49	-0-	-0-	-0-	7	85	42	15	182	91
Natrona	4	49	24	16	194	97	29	352	176	49	595	297
TOTAL[c]	126	1527	764	39	473	237	114	1382	690	279	3382	1691

[a]Assumes a 100-foot wide construction ROW. For purposes of this analysis, a 100-foot wide construction ROW was assumed in order to provide findings for use in decisions for issuance of Temporary Use Permits which may be needed in some places. Generally, construction would be limited to the 50 foot ROW.

[b]Assumes an operational ROW of 50 feet, plus the width of the pipe.

[c]Numbers were generally adjusted to the nearest whole.



Map 2-1. GENERAL LOCATION OF PROPOSED TRUNKLINE

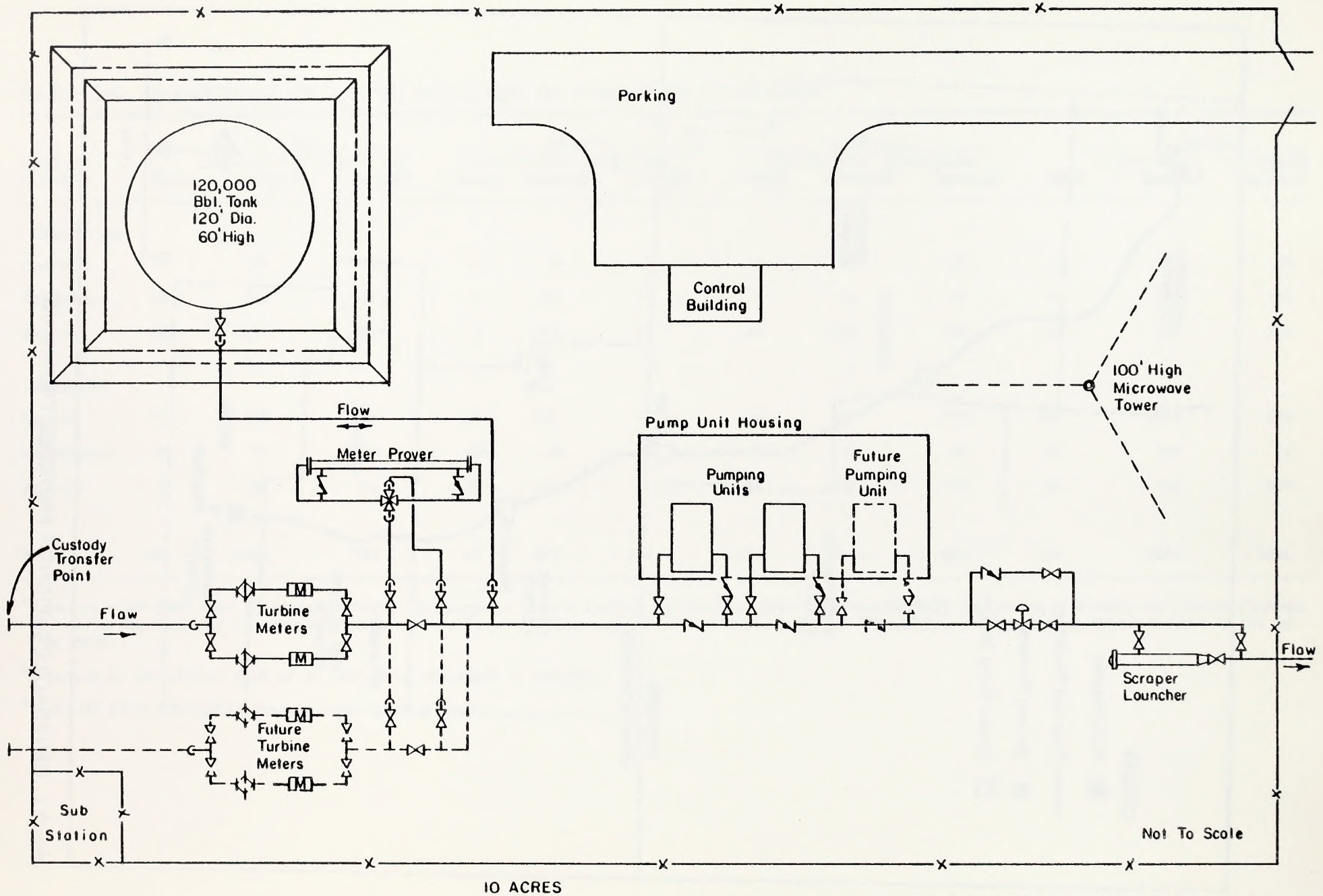


Figure 2-1. PARACHUTE PUMP STATION

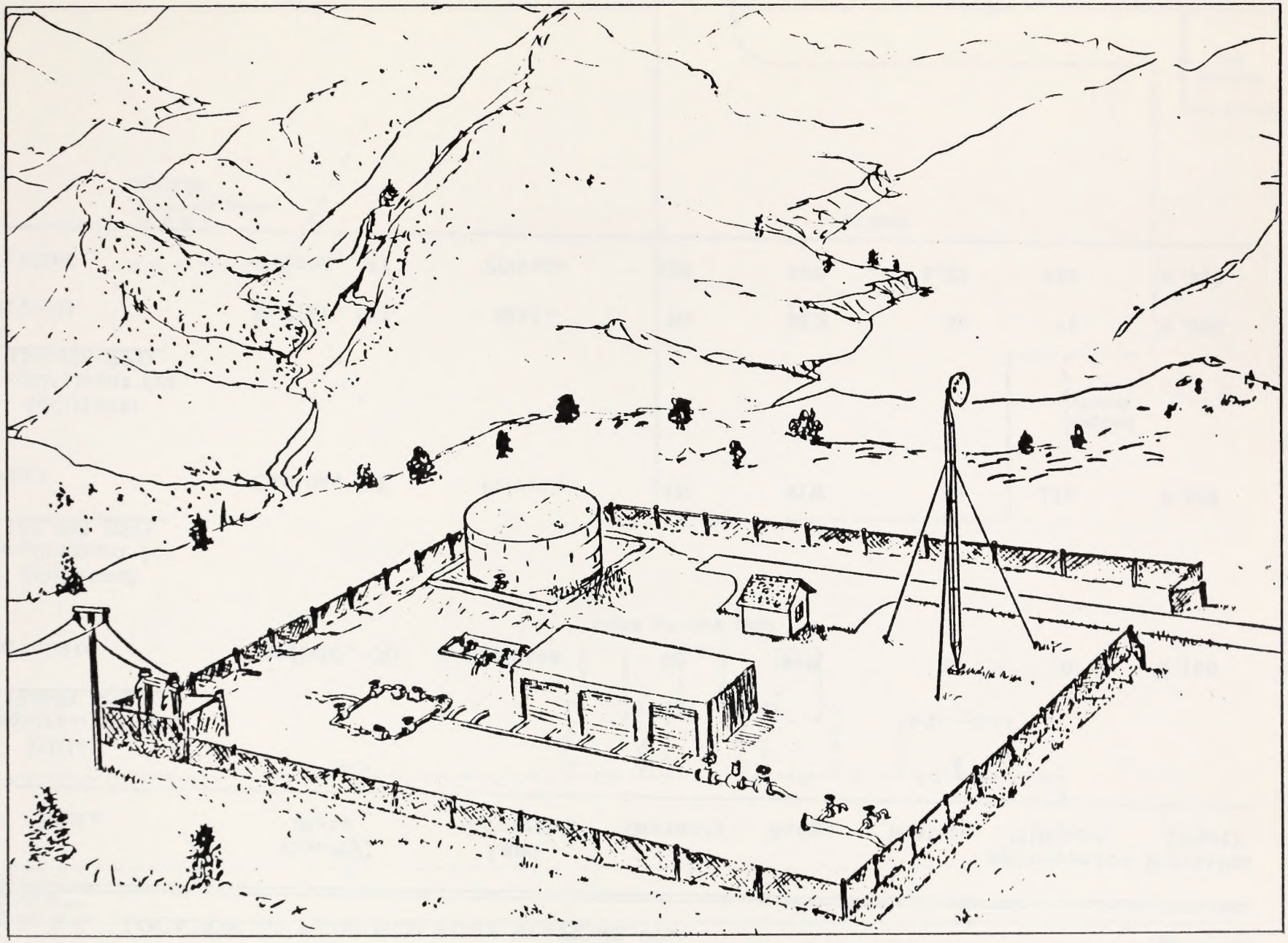


Figure 2-2. AERIAL VIEW-PARACHUTE STATION

Table 2-2. LOCATION OF PROPOSED PUMP STATIONS

Name	County, State	Land Ownership	Township	Range	Section	Approximate Milepost	Elevation (Feet)
Initial Requirement for 47,000 BPD							
Parachute	Garfield, CO	Private	5S	96W	14	0	8,100
Additional Requirement for 100,000 BPD							
Baggs	Carbon, WY	Private	13N	91W	32	116	6,200
Additional Requirement for 150,000 BPD							
Maybell	Moffat, CO	State	7N	95W	32	71	6,000
Rawlins	Carbon, WY	Private	23N	89W	8,17	188	6,500

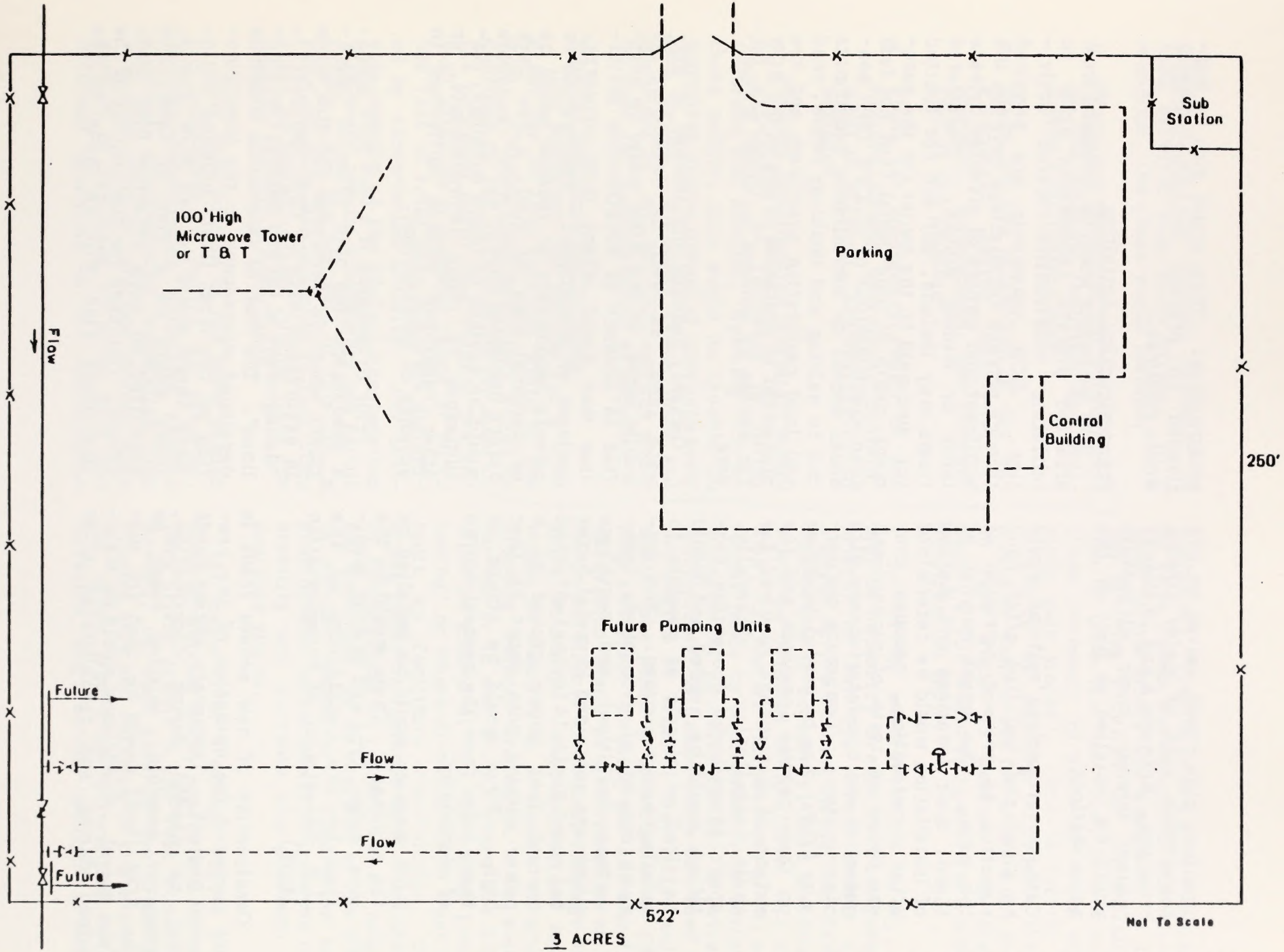


Figure 2-3. TYPICAL INTERMEDIATE PUMP STATION

pipeline, plus check valves on the downstream side of major stream crossings. Between 4 and 10 above-ground scraper traps ultimately would be installed as part of the pump stations.

7. Cathodic protection systems would be sited and installed after construction to prevent corrosion of the pipe. The exact number of these, their locations and method of installation would be determined after construction, because they are based on tests of pipe-to-soil potential and non-interference with other systems. Temporary use permits (TUPs) may be needed depending on their precise locations and the extent of disturbance required for their installation. Generally, about 15 cathodic protection rectifiers would be needed and would be sited as closely as possible to existing power sources. The systems consist of groundbeds (subsurface facilities) and rectifiers which are contained in metal boxes (of about 21x13x14 inches) attached several feet above ground to a power service pole about 35 feet high. Wires would be strung to these poles from the nearest source of electricity.

8. ROW markers would be installed by the applicant. These would be the size, color, type and number specified by the regulations of the U.S. Department of Transportation (DOT).

Construction of new access roads is not proposed for operation of the proposed project. Temporary access roads may be needed during construction. Wherever possible, existing roads or the ROW itself would be used for surface travel. Roads used would be maintained during and rehabilitated after construction. They would also be barricaded to prevent vehicular traffic where required.

Preconstruction Activities

ROW easements would be purchased from affected private landowners prior to initiating construction-related activities. ROW easements are acquired through private negotiations between the applicant and owners of affected private lands or mining claims. Negotiated items may include, but are not limited to: sum paid to the owner for the easement; depth of pipe burial (but not less than specifications of 47 CFR 195); seasonal access or surveillance constraints due to calving and lambing; fence, road and land restoration practices; and the placement of obstacles to use of the ROW for access by hunters or other trespassers.

Owners, tenants and leasees of private land, as well as developers of public lands, in the ROW would be notified in advance of construction activities that could affect their property, business or operations. Notification to private landowners or tenants would be by personal visit or mail, a few days before beginning construction. Ranchers would be advised of fence openings, disturbances to range improvements, or other range-use related activities in advance of construction.

Prior to issuance of a BLM ROW grant, a preconstruction plan (Plan of Operations) would be developed for BLM lands in accordance with 43 CFR 2882.2-4(c), "Management of Oil and Natural Gas Pipelines". The Plan of Operations would be developed subsequent to the identification of the most likely pipeline route. Since there would be two ROW grants, there would be a Plan of Operations submitted to each affected BLM State Office. Guidance for the content of the Operations Plan will be made to the

applicant by the Project Manager in each affected BLM State office. At a minimum, the plans would include:

- Plans and Schedules for construction of the pipeline facilities and estimated construction costs
- Plans for the protection of the environment during construction, operation, maintenance, and termination of the pipeline
- Plans for emergency repair of any rupture during operation, containment of effluent, and restoration of damages

Pipeline construction materials would be off-loaded at railheads in Rifle, Colorado and Rawlins, Wyoming. From those points, pipe would be trucked to worksites over a period of approximately two weeks. Piceance Creek Road and Highways 13, 40, 80, 287, and 220 would be used for transportation of supplies.

Pipeline Construction Methods

The applicant has applied for a ROW grant for 50 feet plus the width of the pipe. Construction activities would be confined to the 50-foot ROW for most of the proposed route (see Figures 2-4 and 2-5) although a possible range of 50 to 100 feet of total area could be disturbed by construction activity. Any activity outside of the 50-foot construction ROW would require a temporary use permit (TUP). For the purposes of this EIS, a 100-foot ROW was analyzed so that TUPs could be issued without further need for analysis for NEPA compliance.

Only that portion of the ROW needed for construction would be cleared. Typical construction activities require clearing above-ground vegetation and obstacles from an average 35-foot wide portion of the ROW to allow safe and efficient operation of the construction equipment. Blading of the ROW would not be done unless necessary for the movement of machinery and equipment or for the ditching required for the installation of pipe (for instance, it is sometimes necessary to blade in areas with steep side slopes). Due to terrain or proximity of existing utilities, there would be some areas for which more than 50 feet would be needed. In these cases, a TUP would be needed for a wider construction ROW.

To further ensure vehicle safety, it may be necessary to construct temporary bridges or culverts across creeks and arroyos on the working side of the ROW. Where this is necessary, road materials would be obtained either from: (1) the ROW, (2) commercial sources, or (3) adjacent lands by permission from surface management agencies (SMAs) or private landowners. If public lands are used as the source of mineral materials, sales would take place as specified in 43 CFR 3610 and 3611. Grading and cut-and-fill excavation would be performed so as to minimize effects on natural drainage and slope stability. Surplus surface soils would be handled in a manner to avoid blocking natural drainages. On steep terrain or in wet areas, where the ROW must be graded at two elevations (two-toning) or where diversion dams must be built to facilitate construction, the areas would be restored upon completion of construction to resemble their original condition, or as required by the SMA or private landowner. Excavation and grading may be necessary to increase the stability and decrease the gradient of unstable slopes.

At major river crossings (Table 2-3) cleared working areas approximately 250 feet (river front) x 450 feet would be needed, on each side of the crossing. Precise size and location of these working areas would be determined after detailed engineering analysis, and,

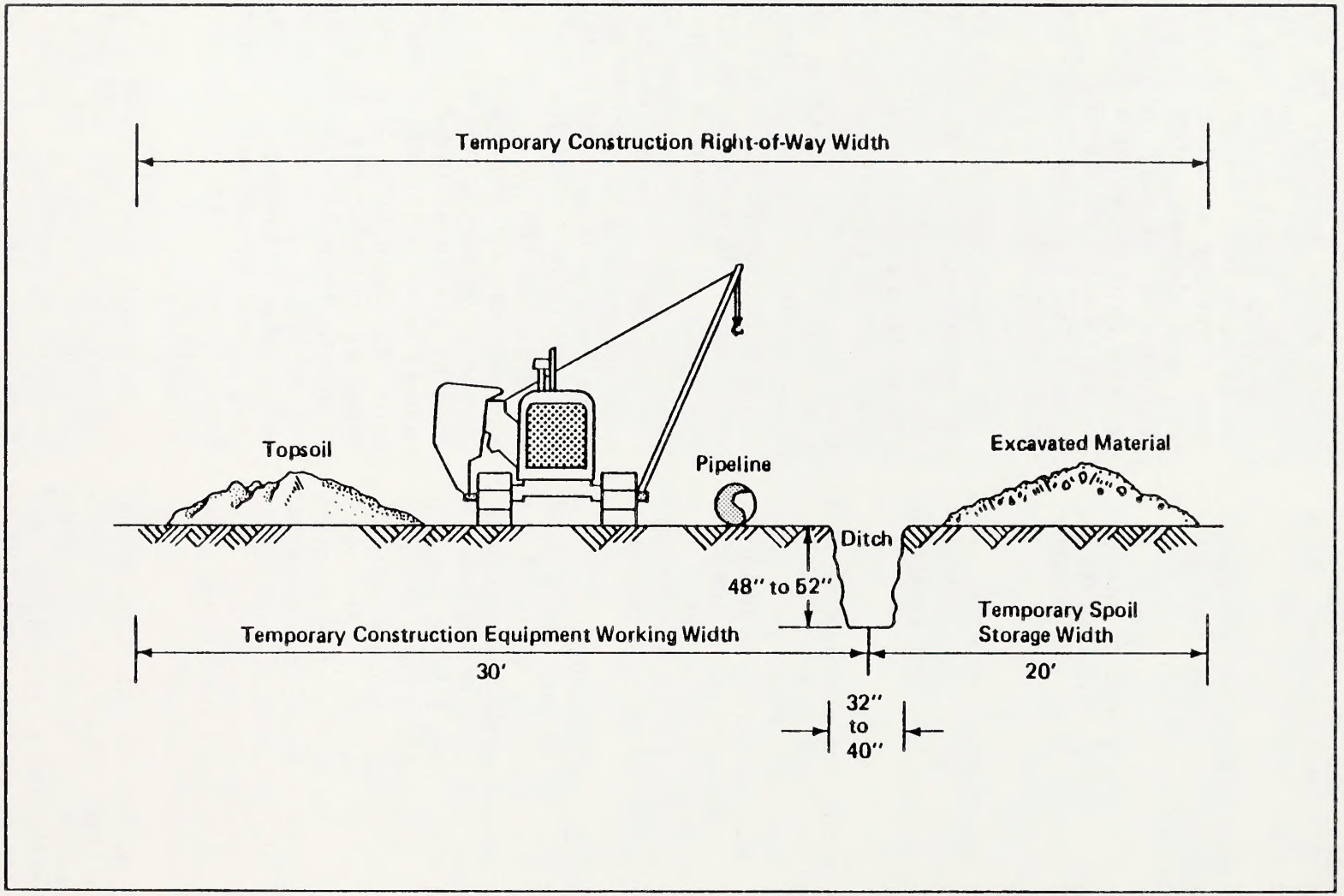


Figure 2-4. CONSTRUCTION RIGHT-OF-WAY CROSS SECTION

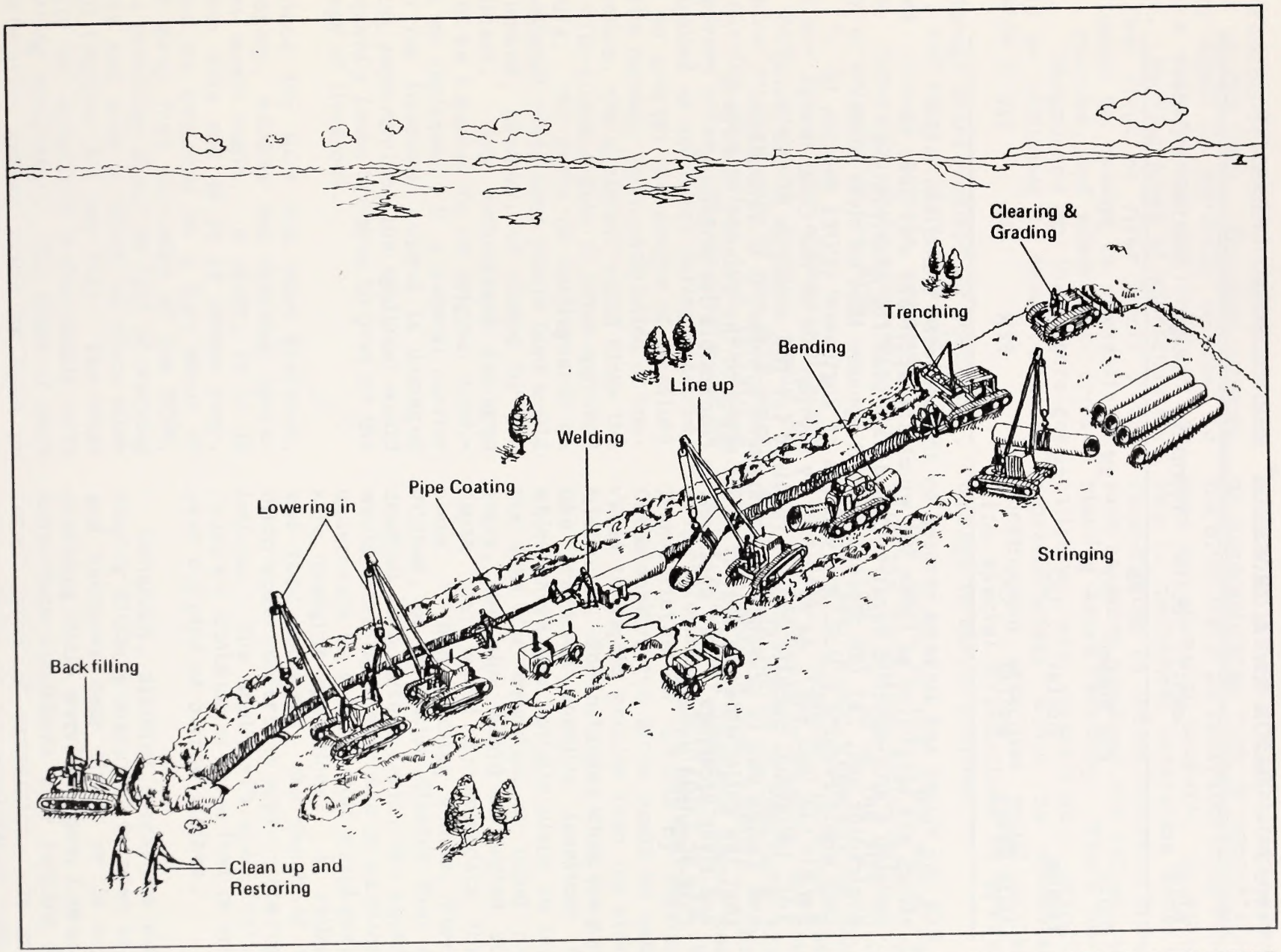


Figure 2-5. TYPICAL CONSTRUCTION ACTIVITIES

Table 2-3. MAJOR RIVER CROSSINGS[a] FOR PROPOSED TRUNKLINE

River	County	State	Township	Range	Section	Milepost
White	Rio Blanco	CO	2N	97W	34	37
Yampa	Moffat	CO	7N	95W	33	71
Little Snake	Moffat	CO	12N	92W	16	110

[a]Of the rivers and streams crossed by the proposed trunkline, major rivers are identified as those for which the applicant may need to develop a site-specific construction design plan for construction contractor use. At the present time it appears that no river crossings would require a U.S. Army Corps of Engineers' (COE) Section 10 Permit (33 USC 403). As specified by section 404 of the Clean Water Act, individual permits may be required for the crossings of the White and Yampa due to presence of Endangered Species. It is anticipated that the nationwide 404 Permit would apply to the balance of stream and river crossings. The applicant is responsible for obtaining COE-required permits.

where necessary, TUPs would be obtained under 43 CFR 2880. The river crossing points would be carefully selected to reduce disturbance of riverbeds or banks. Working areas of approximately 100 feet (road or river front) x 250 feet would be needed on each side of road, railroad, and minor river crossings. Disturbance to these acreages would be additional to those reflected in Table 2-1.

Storage areas required for equipment, pipe, and other materials would be acquired through private permission or TUPs. Generally, these areas would not be on or adjacent to the ROW.

Where fences are encountered along the ROW, adequate bracing would be installed at each edge of the ROW prior to cutting the wires and installing temporary gates. The opening would be controlled as necessary during construction to prevent the escape of livestock or wild horses. Upon completion of construction, the applicant would close the gap with a locked gate or other approved closure. No gates or cattleguards on established roads over public land would be locked, blocked, or closed by the applicant. Any cattleguard damaged would be repaired to its original condition or replaced. If a natural barrier used for livestock control is damaged during construction, the applicant would adequately fence the area to prevent the escape of livestock.

Once the ROW has been prepared, stringing, welding and ditching operations would begin. A ditch, 32 to 40 inches wide and 48 to 52 inches deep, would be centered on a line about 20 feet away from one edge of the ROW, thus providing about 30 feet of working space and area in which to place ditch spoil (Figures 2-4 and 2-5). The ditch would be excavated mechanically with ditching equipment. The ditch of each construction spread would be open no more than seven miles at a time for no more than 14 days. In areas where loose or unconsolidated rock is encountered, the ditch would be excavated using backhoes and clamshell buckets. An exception to mechanical excavation would be hand-digging to locate buried utilities, such as other pipelines and cables, and blasting where necessary. Where buried utilities are identified, utilities representatives would be consulted. Construction activities would proceed with special precautions to prevent damage to buried utilities.

The depth of the ditch would vary with the conditions encountered. The cover from the top of the pipe to the ground level would generally be three feet thick. However, in areas where rocks are removed by blasting, the cover would be 30 inches in congested areas and 18 inches in open country. These depths and those discussed above would be in conformance with DOT's 49 CFR 195, Transportation of Liquids by Pipeline. Occasionally, the ditch would be excavated to depths greater than the stated minimums. For instance, when the pipeline traverses specific locations for which there are definite plans to level the land for irrigation or other purposes, the pipe would be buried at a depth that would accommodate these plans. When crossing canals, borrow ditches, or irrigation ditches that are dredged to maintain depth, the pipeline would either span overhead or be ditched underneath to a depth that would permit safe dredging operations. At railroad and road crossings, the depth of the ditch would conform to appropriate regulations. The applicant's specifications require a minimum of three feet of cover over the pipe at borrow ditches.

Generally, ditching operations would employ ditching machines in open areas and backhoes near rivers or in areas providing little working space; however, subsurface conditions may require different types of excavation. In areas where loose or unconsolidated rock is

encountered, the ditch line may be ripped mechanically. This process would involve a tractor dragging a long shank (ripper-tooth) behind it to dislodge the material. If the material encountered cannot be ripped, it would be blasted. In preparation for blasting, unconsolidated material would be removed from the ditch line and a series of holes would be drilled by air-powered drills generally suspended from a side-boom tractor (twin drills), which also tows the compressor that supplies the air. However, self-propelled drills (air-track) may be used if a significant amount of drilling is required in one location.

Blasting would be used as little as possible and only when necessary. Normally, the effects of the blasting are confined to the ROW. Where blasting is necessary, the following safety precautions would be taken:

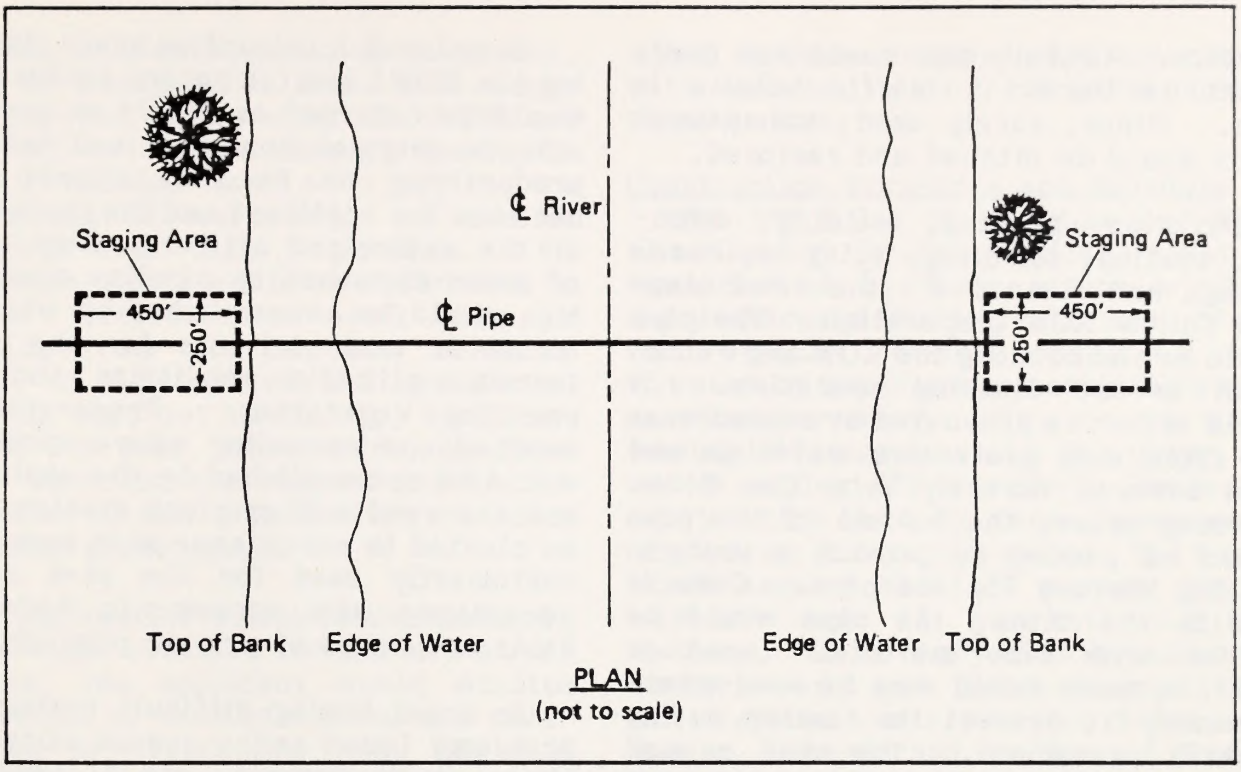
- In areas of human use, blasting would be blanketed (matted).
- Landowners or tenants in close proximity to the blasting would be notified in advance so that livestock and other property could be adequately protected.
- Before blasting, the affected area would be checked to ensure that construction personnel and equipment and local residents are out of danger.
- Blasting would be controlled or limited where damage to rock mass may create slope instability.
- In areas where blasting is not feasible because of proximity to other pipelines or utilities, the ditch would be dug by hand.

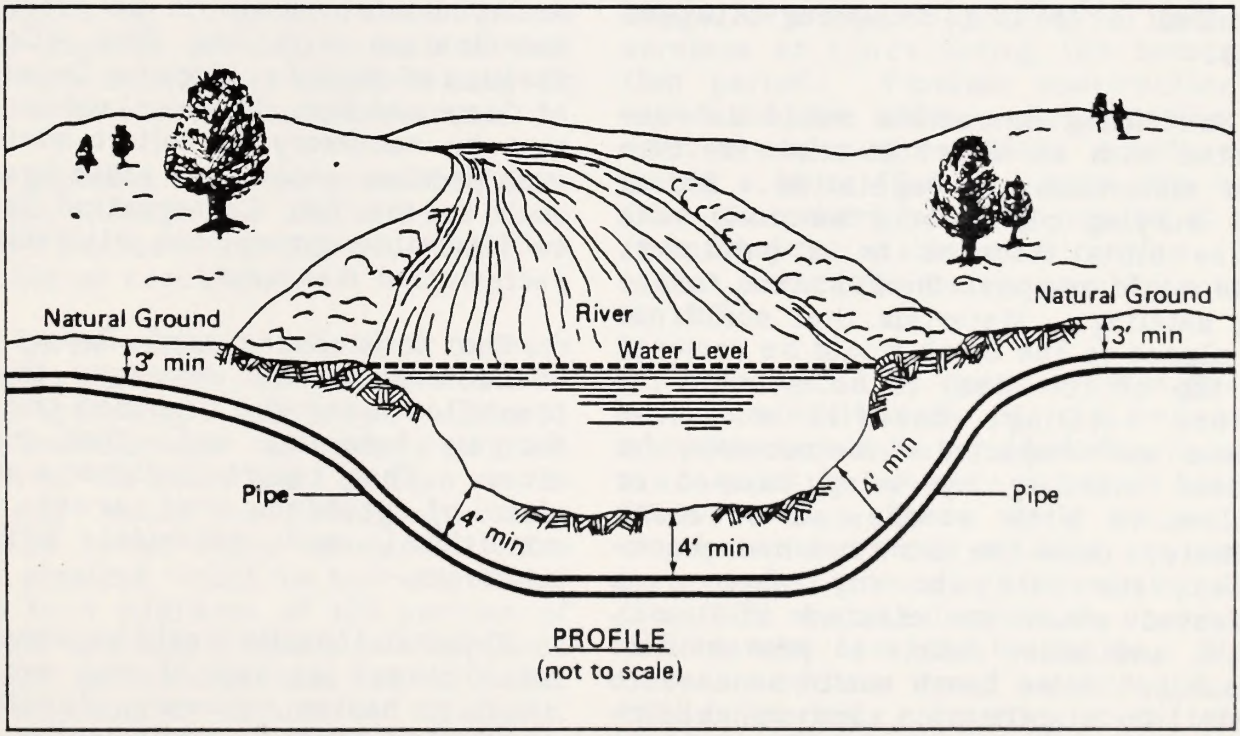
River crossings would not be affected during periods of high flow (usually late spring). Figure 2-6 illustrates a profile and plan for a typical river crossing. Normally, construction of crossings would be accomplished within two weeks. The ditch would be excavated to the depth that minimizes the effect of scour action to the pipeline during periods of high flow. Cover over the pipeline in the streambed would be beneath the maximum scour depth. The minimum cover would be four feet, or 20 percent of the distance of maximum scour, whichever is greater, beneath the maximum scour depth. Reconstruction of streambeds would be consistent with COE requirements for 404 permits (33 USC 1344).

During construction of river crossings, the drainage or storm runoff from riverbank staging areas would be controlled via detention basins, evaporation pits or straw bale filters to ensure that levels of suspended solids, grease or oil do not exceed ambient receiving water standards.

Normally, the ditch would be graded on each approach to the river to fit the natural sag of the pipe to minimize potential exposure of the pipe at the banks. Every effort would be made to minimize the effects of construction on water flow. As near as practical, the gradient of the stream would be restored upon completion of construction, stream banks would be restored to resemble their original grade, and breakers or riprap would be placed over the pipeline along riverbanks where necessary for erosion control. The pipeline would be weighted with concrete to offset buoyancy and to ensure that it remained in the underwater ditch.

Roadbeds that support railroads would be crossed by boring a hole beneath the bed rather than by ditching across the surface. Casing would be installed at these roadbeds and at road crossings only where they are required by federal, state, local, or railroad authorities. All paved and improved roads would be crossed by boring under them if





Note: The burial depth shown is where the river bottom materials are earth, sand or gravels.

Figure 2-6. PLAN AND PROFILE OF TYPICAL RIVER CROSSING

possible. Gravel, dirt roads and trails would be bored if traffic volume is high. Other, rarely used, unimproved roads would be ditched and restored.

Stringing, bending, welding, ditching, coating, lowering, tying-in, backfilling, and cleanup are the usual steps that follow ROW preparation. The pipe would be placed along the ROW and welded prior to the ditching operation. It would either be precoated or coated over the ditch with protective materials and then lowered directly into the ditch. In rocky areas, the bottom of the pipe would be padded to provide a uniform bearing surface for the pipe. Once it was in the ditch, the pipe would be padded with fine materials (sand or soil), or rock shield may be used where necessary to protect its coating during backfill operations. The sand or soil would be obtained from private sources or, if on public lands, purchased as detailed in 43 CFR, Subparts 3610 and 3611.

Backfilling operations would be conducted with an effort to minimize further disturbance to vegetation. Filling and burying pipe would be done with auger units mounted on a bulldozer. This would compact the fill, thus reducing settling. Materials that could not be placed in the ditch would be crowned on top of the ditch to compensate for future settling. Backfill would be graded and compacted where necessary for ground stability by being tamped or walked-in with a wheeled or track vehicle. Once the ditch has been backfilled, the ROW and any other areas affected would be cleaned of trash, brush and other debris to prevent fire hazards. Some brush would be used to assist in stabilization and rehabilitation of the line. The ROW would be graded where needed and all disturbed surfaces would be restored to approximately the preconstruction grade.

Completed construction areas (including the ROW) and temporary access roads would be returned as nearly as practicable to original condition and level of productivity or to that agreed upon between the applicant and the landowners or the authorized officer. Restoration of areas disturbed by pipeline construction would be accomplished by whatever means is most suitable for the soils, terrain, climatic conditions and surrounding vegetation. Preparation of seedbed and reseeding where applicable would be accomplished by the applicant, and the seed mix or plant species would be planted in accordance with techniques customarily used for the area and in accordance with agreements made with SMAs or owners of private property.

In areas having difficult reclamation problems (dune soils, excess salts/alkalinity, rock outcrop, etc.), revegetation would be considered a special management problem to be resolved in coordination with the SMA (Colorado Division of Wildlife, Wyoming Department of Game and Fish, BLM) or landowner. It may be necessary to solicit advice for such problem areas from other agencies, such as the Soil Conservation Service, to determine appropriate mitigative and reclamation measures.

The Soils Background Report lists, characterizes, and discusses the soils identified along the proposed trunkline, Rangely laterals, and other alternatives. That report includes a discussion of problem soil areas and/or conditions, and potential mitigation measures.

Original topsoils would be saved, and later placed on top of the excavated ditch to hasten recovery of cultivated or grazing lands. Additionally, where appropriate, terraces would be built to enhance retention of water and seeds. Depending on the erosion condition of

the soil, erosion control, as necessary, would be employed on areas with slopes of 5 percent or more on the ROW and along any cuts made through unconsolidated materials. Some soils may require that special measures must be used on slopes of less than 5 percent. All reasonable means would be undertaken to control erosion and soil damage resulting from construction, rehabilitation, or maintenance and operations, including (but not limited to) construction of terraces, water bars, or other water diversion structures, and implementation of soil stabilization measures in erosion prone areas.

During routine aerial reconnaissance, which would continue for the life of the pipeline, the applicant would monitor the success of erosion control and revegetation in accordance with the BLM monitoring plan, which would be a condition of the ROW grant. The purpose of the monitoring program would be to quickly identify problem areas, so that appropriate mitigative measures may be employed to correct the problem(s).

The pipeline would be protected from corrosion through the use of pipe coating; and cathodic protection, rectifiers or anodes as required.

All girth welds to be placed beneath railroads, highways, and rivers would be radiographically inspected (x-ray) before installation. As a minimum, ten percent of the welds made by each welder each day would be radiographically inspected in all other locations. The entire pipeline would be hydrostatically tested to a minimum of 125 percent of maximum operating pressure in compliance with DOT safety standards (49 CFR 195, Transportation of Liquids by Pipeline). Water for hydrostatic testing would be obtained through agreements consistent with local, state and federal regulations and ordinances. The estimated amount of water required for trunkline testing would be 50 acre feet. The test water would be disposed of in accordance with federal, state, and local agency requirements.

Construction Workforce and Schedule

The 279 miles of trunkline and 35 or 41 miles of lateral pipeline would be constructed by four crews working simultaneously (Table 2-4). Each of the four pipeline sections would be constructed by contractors under the applicant's supervision. Two crews would employ 100 workers, and the other two would employ 132 workers. Estimated construction time for these crews would range from 2.5 to 4 months. The teams would require about 55 percent skilled workers and 45 percent unskilled workers. It is likely that construction workers would seek living accomodations and related services in Rifle and Meeker, Colorado and Rawlins and Casper, Wyoming. The towns of Parachute, Rangely, Maybell, Craig, Colorado and Baggs, Wyoming may also be used for services at times during the construction period. Pipeline construction is scheduled for 1984. Construction of each of the pump stations would occur during a 60 to 75 day period. No more than 45 workers would be needed at any time for pump station construction. The initial Parachute station would be built in 1985.

There would be specific dates during which construction of the proposed trunkline would be avoided due to crucial wildlife use in certain areas (Table 2-5). These would be periods during which crucial wildlife use would be expected according to existing data from BLM or state documents, or consultations with the area biologists. Pipeline construction would not occur during these periods unless specifically authorized by the appropriate BLM Area Manager or other Authorized Officer.

Applicant-Proposed Mitigation

The applicant would undertake a number of construction and restoration

TABLE 2-4. CONSTRUCTION WORKFORCE SIZE AND SCHEDULE

Crew	Miles	Work-force Size	Months to Construct
1. Parachute Station to Maybell	71	100	4
2. Piceance Creek to Rangely	35 or 41	100	2.5
3. Maybell to Ferris	139	132	3
4. Ferris to Casper	69	132	3

TABLE 2-5. CRITICAL/CRUCIAL WILDLIFE USE AREAS AND PERIODS TO AVOID DURING CONSTRUCTION OF PROPOSED TRUNKLINE

Milepost	Critical/Crucial Wildlife Use Areas	Dates During Which Construction Would Be Avoided
0.0 - 4.0	Elk critical winter range	December 1 to March 31
0.0 - 3.0	Mule deer fawning area	May 1 to June 30
3.0 - 6.5	Sage grouse brooding grounds	March 1 to May 15[a]
4.5 - 11.0	Elk critical winter range	December 1 to March 31[a]
4.5 - 5.0	Sage grouse brooding grounds	March 1 to May 15[a]
6.5 - 9.0	Blue grouse brooding grounds	March 1 to May 15[a]
7.0 - 7.5	Sage grouse strutting grounds	March 1 to May 15[a]
12.0 - 15.5	Mule deer critical winter range	December 1 to March 31[a]
14.5	Golden eagle nest	March 1 to July 31[a]
17.0 - 19.0	Mule deer critical winter range	December 1 to March 31[a]
19.5 - 20.5	Sage grouse breeding complex	March 1 to May 15[a]
23.0 - 27.0	Mule deer critical winter range	December 1 to March 31[a]
30.0 - 35.5	Mule deer critical winter range	December 1 to March 31[a]
31.5	Golden eagle nest	March 1 to July 31[a]
37.0	Bald eagle perching/roost site	November 15 to April 15[a]
51.5 - 56.5	Mule deer critical winter range	December 1 to March 31[b]
58.0 - 62.0	Sage grouse strutting grounds	March 15 to June 1[b]
69.0 - 82.0	Mule deer critical winter range	December 1 to March 31[b]
72.0 - 80.0	Crucial riparian habitat	March 15 to June 1[b]
76.0 - 80.0	Sage grouse strutting grounds	March 15 to June 1[b]
77.0	Golden eagle nest	February 1 to July 1[b]
78.0	Golden eagle nest	February 1 to July 1[b]
88.0 - 91.0	Sage grouse breeding complex	March 15 to June 1[b]
91.0 - 94.0	Sage grouse brooding grounds	March 15 to June 1[b]
96.0 - 103.0	Sage grouse brooding grounds	March 15 to June 1[b]
107.0 - 109.5	Sage grouse brooding grounds	March 15 to June 1[b]
107.0 - 115.5	Mule deer critical winter range	December 1 to March 31[b]
109.0 - 111.0	Bald eagle foraging and roosting area	*
130.0	Prairie falcon nest	May 1 to June 30[c]
132.0	Golden eagle nest	May 1 to June 30[c]
132.5	Prairie falcon nest	May 1 to June 30[c]
132.5 - 137.5	Ferruginous hawk nesting area	May 1 to June 30[c]
140.5 - 148.0	Ferruginous hawk nesting area	May 1 to June 30[c]
142.5	Prairie falcon nest	May 1 to June 30[c]
142.5	Golden eagle nest	May 1 to June 30
143.5 - 145.0	Sage grouse breeding complex	March 1 to June 15[d]
150.0 - 153.0	Sage grouse breeding complex	March 1 to June 15[d]
158.0 - 161.5	Sage grouse breeding complex	March 1 to June 15[d]
162.5 - 165.5	Sage grouse breeding complex	March 1 to June 15[d]
169 - 171.0	Ferruginous hawk nesting complex	May 1 to June 30[c]
190.0	Golden eagle nest	May 1 to June 30[c]
195.0 - 198.0	Sage grouse breeding complex	March 1 to June 15[d]

TABLE 2-5. (concluded)

Milepost	Critical/Crucial Wildlife Use Areas	Dates During Which Construction Would Be Avoided[1]
212.5 - 217.5	Deer and elk critical winter range	December 15 to April 15[c]
214.0	Prairie falcon nest	May 1 to June 30[c]
223.0	Golden eagle nest	May 1 to June 30[c]
239.5 - 246.0	Antelope critical winter range	December 1 to March 1[f]
247.0 - 250.5	Sage grouse breeding complex	March 1 to June 15[d]
251.0 - 253.0	Mule deer critical area	December 1 to March 1[e]
251.5 - 257.0	Sage grouse breeding complex	March 1 to June 15[d]

[1]Unless authorized by appropriate Area Manager.

[a]Stipulations provided by BLM-Meeker, Colorado.

[b]Stipulations provided by BLM-Craig, Colorado.

[c]Stipulations provided by BLM-Rawlins, Wyoming.

[d]Stipulations provided by BLM State Office, Wyoming WY-81-21.

[e]Stipulation provided by BLM-Casper, Wyoming.

[f]Stipulation provided by Casper-Wyoming Fish and Game.

*Stipulation to be determined by U.S. Fish and Wildlife Service.

practices in addition to those already mentioned. The resource considerations outlined below are intended to reduce environmental impacts. The applicant would be required to incorporate the proposed mitigating measures into the Plan of Operations, which encompasses the construction through termination phases of the proposed project.

Air and Water Quality. The applicant would conduct all activities associated with the project in a manner that would avoid or minimize degradation of air, land, and water quality. During construction, operation, maintenance, and termination of the project, the applicant would perform activities in accordance with all applicable air and water quality standards, related facility siting standards, and related plans for implementation, including (but not limited to) standards adopted pursuant to the Clean Air Act, as amended (42 USC 7401 et seq.), and the Clean Water Act, as amended (33 USC 1251 et seq.).

Pesticide and Herbicide Use. Pesticides would not be used during construction of these pipelines. An approved herbicide would be used within the fences at the pump stations to prevent weed fires, and around safety signs within the ROW so they remain visible. Herbicide use would be detailed in the Plan of Operations.

Traffic Safety. Adequate warning signs would be positioned far enough in advance of construction zones so that drivers would have sufficient warning to decelerate safely. Signs would be positioned in accordance with relevant regulations.

Geologic Hazards. At several relatively limited portions of the proposed trunkline route, potentially hazardous areas have been identified. None of the geologically hazardous areas are such as to preclude the location, with minor changes in routing, of the pipeline in these areas. Site specific plans would be developed, reviewed, implemented with conditions reviewed or verified during construction, and monitoring programs with specific maintenance programs defined, as indicated in Table 2-6.

Recreation Resources. Construction of the project may occur during months when recreational use is high. The following measures would be taken during the construction period to reduce potential effects:

- Temporary detours would be constructed around the construction zone where secondary access roads do not exist.
- Detour routes would be established using the nearest available secondary access routes.
- The work force use would not conflict with tourist use of public campgrounds or forests for temporary housing; however, recreational use of these facilities would not be denied to workers.

Cultural Resources. Prior to initiating any ground disturbance, the applicant would take all required actions to protect cultural resources in accordance with the following compliance procedures developed by the BLM:

- A Class I cultural resources inventory, as defined by BLM Manual 8111, will be required for the entire length of the cultural resources study area (one mile centered on the proposed action and alternatives).
- The BLM, in consultation with the State Historic Preservation Officers and the applicant, will use the Class I inventory data to determine the level/intensity of additional on-the-ground inventories (Class II and III) for both

TABLE 2-6. PLANS FOR AREAS SUBJECT TO GEOLOGIC HAZARDS ALONG PROPOSED TRUNKLINE

Approximate Mileposts	Areas
3 to 7	Stability of slope before construction and stability of backfill and slope after construction at crossing of East Fork Stewart Gulch, both near its junction with the middle fork and near Rio Blanco/Garfield County line. Snow-cover prevented a detailed examination of the slopes in these areas. If same location is unsuitable, more suitable locations appear to be available.
53 to 58	A four to five mile area southeast of Wapiti Peak requires very careful routing to avoid existing landslide materials or slopes underlain by weak rocks subject to landsliding. Rerouting in this area might be required to avoid the landslide hazards.
65 to 70	The proposed route south of Maybell would cross an area of naturally vegetated sand dunes that are relatively inactive. A route through these sand dunes would require exact routing and restoration measures to prevent reactivation of some sand dunes.
123 to 140	Crossing of relatively small but deep gullies, between Baggs and Mexicana Flats north of Baggs, may require installation of pipes designed to accommodate some future lateral erosion of these gullies. The area is alongside two existing pipelines.
200 to 215	An area of active sand dunes extends for approximately fifteen miles between highway 287/789 and Sand Creek Canyon to the north. Wind direction appears to be toward the east and northeast. The dunes appear to be underlain by relatively impermeable bedrock, and therefore a large number of low areas between dunes are occupied by ponds. Erosion of the dunes occurs whenever disturbance of the dunes by trenching or or rutting from vehicles is done parallel to the wind direction.

Table 2-6. (concluded)

Approximate Mileposts	Areas
200-215 (con't)	Sand Creek itself is being choked by the sand and meanders through Sand Creek Canyon and next to the pipeline route. Throughout the area the proposed route follows an existing pipeline route. However, site-specific plans as to depth of burial, specific locations of the pipe trench, and locations of the haul roads would be developed for the Plan of Operations for the ROW grant.
234 to 238	In the immediate area at the north end of Pathfinder Reservoir, between Sweetwater River and Fish Creek to the north, the proposed route parallels an existing pipeline. The reservoir appears to have an annual fluctuation and has elevated the groundwater table in the area. Water evaporation leaves behind deposits of salt over the land surface. The existing pipeline in the area has been recently protected from corrosion by the salty soil by cathodic protection. Cathodic protection might also be required along the proposed route along with weighting of the pipe in this area. Such measures could be developed during the final design.

federal and non-federal lands, in accordance with Washington Office Instruction Memorandum No. 81-29, dated October 17, 1980. For non-federal lands, Class II and III inventories will be required only when there is affirmative evidence suggesting that the existence of significant cultural resources is likely. Such inventories will be undertaken only with the consent of the private landowners.

- Class II inventories will be required where there is not sufficient data to determine the likelihood of cultural resources occurrences. Data from this inventory will be used to determine the need for Class III inventories. However, a Class III inventory may be substituted for a Class II inventory in cases where it is demonstrated that significant time delay and/or expenses would be incurred by conducting a Class II.

- Class III will be required if it is likely that significant cultural resources will be found. Data from Class III inventories will be used to determine mitigation requirements.

Visual Resources. The applicant would incorporate design measures to protect the scenic values of the area of construction and the adjacent land. For example, all above-ground improvements and barricades would be nonreflective. When a safety color is not required, the color used would be chosen to blend with the natural background for that location.

Wilderness Values. The proposed action is not located within a Wilderness Study Area (or Rare II Area) boundary and does not come closer to a boundary than an already existing road or trail.

Paleontology. Areas along the ROW having a high probability of containing fossils of exceptional scientific value would be identified. Surface exposures of such fossils would be avoided or protected, e.g., by removal. In addition, the construction contractors would be made aware of possible encounters with mammal fossil remains. Should they be unearthed, the BLM would be notified.

Public Monuments and Markers. Where the ROW includes public lands on which cadastral survey monuments and markers are located, the applicant would avoid disturbance or removal of such monuments and markers. If the removal of monuments or markers becomes necessary during specific construction activities, the applicant would advise the appropriate agency of that need. Removal and/or relocation would then be done in accordance with detailed instructions set forth by the appropriate agency.

Timber Removal. In the event it becomes necessary to remove timber from the ROW, all saleable timber would be purchased by the applicant at the total appraised price determined by the Authorized Officer.

100-year Floodplains. Final project design would include estimation by the applicant of 100-year flood stage elevations. All pump stations would be sited above those levels.

Compliance Check and Monitoring

Preconstruction conference(s) would be held with contractor(s), the applicant and Authorized Officer to clarify procedures and expectations to enable efficient implementation of all requirements. Prior to the beginning of pipeline operations, the applicant would submit to the Authorized Officer a certification of construction, verifying that the pipeline system has been constructed and tested in accordance with

the terms of the ROW grant, and in compliance with any required plans and specifications, and applicable Federal and State laws and regulations. Compliance checks would be made throughout construction by representatives of the Authorized Officer. When all developments and rehabilitation have been completed, a final, joint compliance check of the ROW would be made by a representative of the applicant and the Authorized Officer or his designated representative. The purpose of this check would be to determine compliance with the terms and conditions of the ROW grant. The applicant would perform, at its own expense, any reasonable and necessary monitoring, modifications or additional reclamation work required to comply with the terms and conditions of the ROW grant.

Operation and Maintenance

Aerial patrols would be conducted by the applicant or subcontractor to inspect the ROW at least every two weeks in order to determine the integrity of the pipeline and the success of mitigation measures. Surface traffic would be limited to semiannual valve inspections, annual corrosion surveys, ROW maintenance, and emergency repairs to the pipeline. An operating and maintenance staff of about 35 permanent employees would be needed. About 25 of these would be located in Meeker, Colorado, with as many as eight employees hired locally and trained for work. The other ten would be assigned in towns along the route. The pressures, flow rates, and status information of the system would be telecommunicated from the pump station(s) to the applicant's control center (planned for Meeker) and monitored by computers and personnel on a 24 hour per day basis.

Ruptures

In Exxon Pipeline Company's (EPC) system, which contains 9,000 miles of pipeline and several hundred stations (some as old as 60 years), the total number of DOT-reportable outages for each category for the past 10 years (1970-1980) is as follows:

Cause of Outage	10 yr. Total	Frequency over past 10 yrs.
Corrosion	42	= 0.0005 per mile per year
Structural	13	= 0.0001 per mile per year
Outside Forces	31	= 0.0003 per mile per year
Miscellaneous Others	57	= 0.0006 per mile per year
Composite Total	141	= 0.0016 per mile per year

La Sal Pipe Line Company would employ the latest available technology in pipe coating, cathodic protection, structural testing, marking and warning signs, and computer controls to even further mitigate these factors. As a result, the expected outage frequency is probably less than one-third the composite for all EPC pipelines. However, as a further precaution, La Sal Pipe Line Company would conduct an educational program to enable the public to recognize a pipeline emergency and how to report it to the appropriate La Sal Pipe Line Company office.

Emergency Procedures

It would be the responsibility of the Control Center operator in Meeker, Colorado to identify and control conditions along the pipeline route. The Control Center would be attended 24 hours a day, seven days a week. Computers would continuously monitor pipeline pressure and flow conditions at key points. Computers would be programmed to sound an alarm any time there is a deviation in pressure or flow, indicative of an outage or unusual condition in the pipeline system.

The indications of an outage may come from several sources--a telephone call from a member of the public, radio alert

from an aerial patrol pilot, or alarm from the computers. Upon receiving a report from any of these sources, the operator would immediately implement emergency procedures--the first priority being to secure the area to reduce the possibility of damage to persons or property. The sequence of response action would be as follows:

1. Confirm the probable location of the leak, using all the information available, including pressure and flow conditions from the computer.

2. Shutdown upstream pumping facilities, close appropriate valves on the line or to storage tanks in order to reduce oil spillage.

3. Dispatch people by road (assisted by the aerial patrol pilot if needed), to the scene of the leak to close other valves, establish roadblocks, evaluate hazard, warn people, and in general prevent personal injuries and minimize further to property.

4. A company employee in charge at the leak site would determine the proper way of controlling the liquid spill to minimize damage to people or property and the procedures necessary for repairing or replacing the pipeline.

5. Simultaneous with these actions, the nearest pipeline maintenance crew would be notified and directed to the leak site with the necessary repair and safety equipment.

6. During the repair, the supervisor in charge would demand strict adherence to all safety rules.

7. Simultaneous with these actions, an official of La Sal Pipe Line Company would notify the appropriate federal, state, and local regulatory agencies as required by law and/or organizations of the event or private land owner if one is involved.

8. Emergency booms and skimmers would be employed as appropriate on any streams that are endangered by the spill. The booms would contain the spilled oil, and vacuum tank trucks would be used to pick up puddles of oil from the ground or from water surfaces.

9. After repairs have been completed, the Control Center operator would be notified and the valves opened and pumps started to refill the line and put it back in service. While the line is being refilled, the leak location would be observed to make sure satisfactory repairs have been made.

10. A complete report would be made showing all data obtained and action taken, from time of notification or suspicion of a leak to final repair and return to operations. The report would include the conditions at the leak site, damage to the area or people, repair procedures employed, and final cleanup of the area.

11. This report and facts associated with it would be reviewed and critiqued by company officials to determine improvements that can and would be made in the emergency procedure plan.

ALTERNATIVES

The proposed action as described above was determined as a result of several months of initial information collection, including the scoping process, continued consultation with SMAs, route "flyovers", and, finally, field surveys and flagging activities. Because of these opportunities to improve information over time, the

proposed action varies somewhat from trunkline and lateral routings originally proposed by La Sal Pipe Line Company in January 1981. New information about terrain conditions and potential construction impacts resulted in minor realignments of the proposed action.

As major alternatives or changes to the originally proposed routing were suggested, an effort was made to select those which provided reasonable alternatives to the proposed action for detailed impact analysis. The exclusionary criteria used in the selection process were: (1) the alternative does not provide an option which is clearly better than the proposed action in terms of fewer environmental impacts; and (2) the alternative is not technically feasible. Judgements about whether or not the criterion was met were based on information obtained in the scoping process and professional experience.

Four types of alternatives identified were:

1. Transportation of shale oil by truck or rail

2. Redesign the pipeline system to carry raw shale oil, too

3. Alternative routings for segments of the proposed trunkline

4. Alternative routings for the entire Rangely lateral

Alternatives in Type 2 were screened from further analysis based on Criterion 2. Raw shale oil is not compatible with upgraded shale oil. The two can neither be mixed nor batched. Alternatives in Type 1 were screened from further analysis based on Criterion 1. Other modes of transportation from the Piceance Creek area to Casper would clearly not provide an environmentally better option to the proposed action.

Route Alternatives

Route alternatives selected for detailed analysis are shown on Map 2-2. Two alternative routes for the Rangely lateral were analyzed. These are:

Southern Rangely Lateral Alternative (AB). This approximately 41 mile alternative in Colorado would depart the proposed trunkline at about MP 21.75.

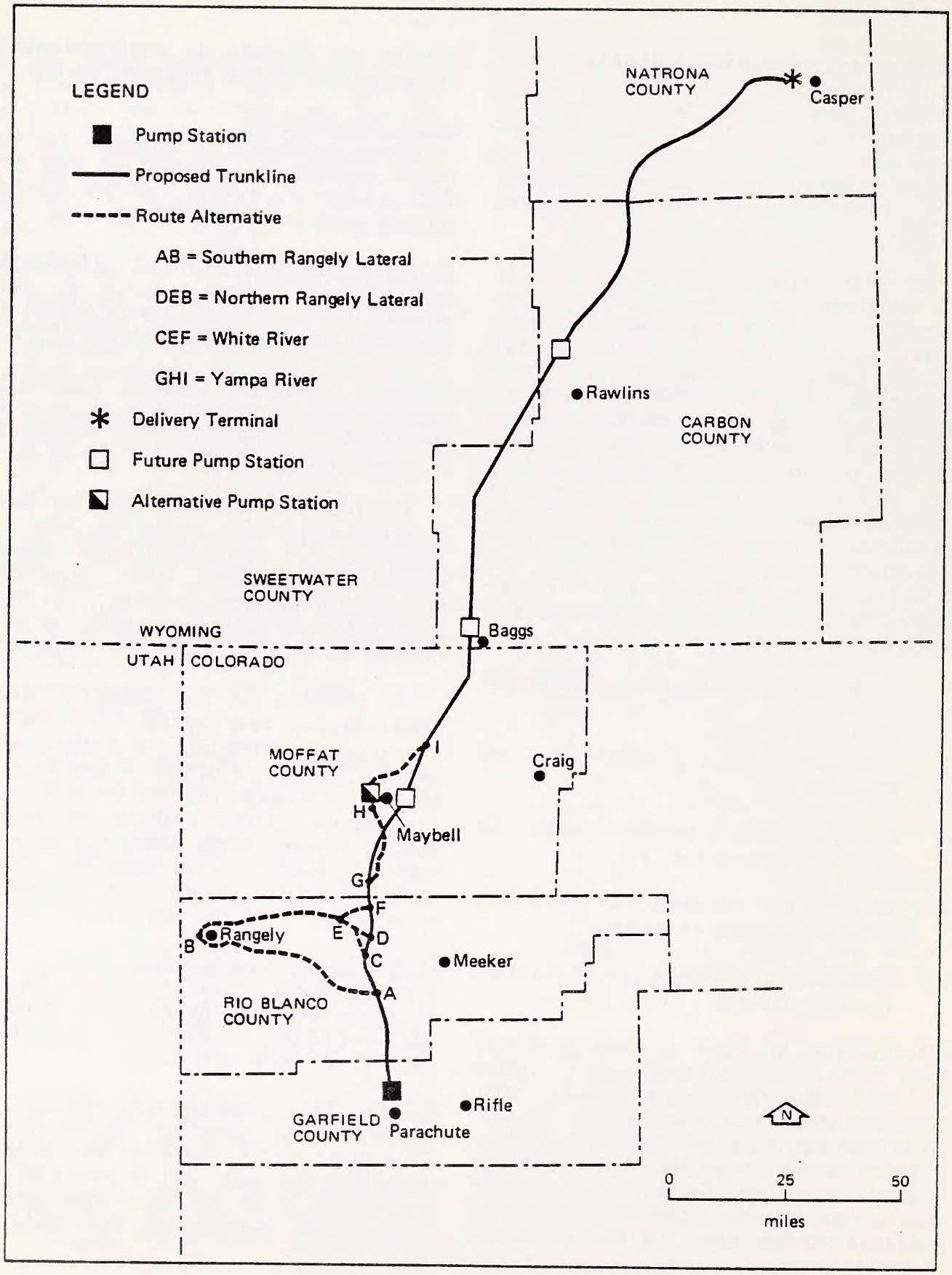
Northern Rangely Lateral Alternative (DEB). This approximately 35 mile alternative in Colorado would depart the proposed trunkline at about MP 36.5.

The locations of these Rangely lateral alternatives are shown on Map 2 in Appendix F. Two additional Rangely lateral alternatives were considered during the scoping process, but were excluded from further analysis for environmental reasons, based on Criterion 1.

In addition to the Rangely lateral alternatives, two partial reroutings of the proposed trunkline were analyzed in detail. Both of these route segment alternatives were proposed by BLM representatives during scoping meetings. Some revisions were suggested as a result of flight reconnaissance, during which potential environmental problems were noted. The two alternatives are:

White River Alternative (CEF). This approximately 16-mile alternative in Colorado departs the proposed trunkline segment (CDF) at about MP 34.5 and rejoins it at about MP 45.25.

Yampa River Alternative (GHI). This approximately 38-mile alternative in Colorado would depart the proposed trunkline segment (GI) at about MP 49.5 and rejoin it at MP 86. This alternative would necessitate relocating the



Map 2-2. GENERAL LOCATION OF ALTERNATIVE ROUTES

proposed Maybell pump station to section 23, Township 7N, Range 96W.

The locations of these trunkline segment alternatives are shown on Map 3 in Appendix F.

The ownership and acreages of lands that would be directly affected during construction and operation of each alternative are listed and summarized in Table 2-7. Table 2-8 lists for each alternative the major river crossings which might require U.S. Army Corp of Engineers' (COE) permits and site-specific construction design plans for construction contractor use.

Finally, the No Action Alternative was considered as an alternative to the proposed action. The No Action Alternative represents BLM denial of the ROW grant to the applicant for construction and operation of the proposed action. Analysis of potential impacts for the two Rangely lateral alternatives, the White River Alternative, the Yampa River Alternative, and the No Action Alternative was conducted at the same level as for the proposed action.

Special Construction Practices for Alternative Routes

If any of the alternative routes is ultimately selected, the applicant would undertake construction and operation using the same practices and procedures as specified under the proposed action section earlier in this chapter. Table 2-9 specifies the dates construction would be avoided to reduce potential impacts to wildlife resources for each alternative. Table 2-10 lists (by mileposts) routing considerations for areas subject to geologic hazards along each alternative.

One important area for wild horses is traversed near MP 1 of the Northern Rangely Lateral Alternative. At this location, wild horses depend on a developed spring as a water source. If it is determined that wild horses are near this area prior to the time of construction, La Sal Pipe Line Company would provide an alternate source of water until construction activity in the vicinity is completed.

AUTHORIZING ACTIONS

In order to implement La Sal Pipe Line Company's proposed action, several authorizing actions would be needed from certain federal, state, and local authorities. Authorizing actions are approvals that take the form of ROW grants, stream crossing permits, microwave communication licenses, and other special-use permits. Given La Sal's proposal, and the alternatives selected for detailed analysis, the following authorizing actions would be needed prior to beginning pipeline construction.

Federal

Bureau of Land Management (BLM). The BLM is responsible for authorizing the actions listed below and for coordinating the preparation of ROW stipulations by affected federal agencies to ensure consistency between agencies.

1. Issuance of a grant of ROW for construction and operation of trunk and lateral pipelines and associated facilities (pump stations, power and communication lines, access roads, cathodic protection system, and microwave towers). The proposed trunkline and facilities would cross 126 miles of federal land from the Roan Plateau near Parachute, Colorado to Casper, Wyoming. The lateral pipeline to Rangely, Colorado, would cross an additional 32 or 38 miles of federal land, depending on which lateral alternative route was selected. The ROW would be issued under the authority of Section 28 of the Mineral Leasing Act of 1920,

Table 2-7. OWNERSHIP OF LANDS AFFECTED BY ALTERNATIVES

STATE Counties	BLM Miles	BLM Construction Acreage[a]	BLM Operational Acreage[b]	STATE Miles	STATE Construction Average[a]	STATE Operational Acreage[b]	PRIVATE Miles	PRIVATE Construction Acreage[a]	PRIVATE Operational Acreage[b]	TOTAL Miles	TOTAL Construction Acreage[a]	TOTAL Operational Acreage[b]
COLORADO												
Rio Blanco Co.												
Southern Rangely Lateral	38	460	230	1	12	6	2	24	12	41	496	248
Northern Rangely Lateral	32	388	194	0	0	0	3	36	18	35	424	212
White River	12	146	73	1	12	6	3	36	18	16	194	97
Moffat Co.												
Yampa River	13	158	79	4	48	24	21	255	127	38	461	230

[a] Assumes a 100-foot wide construction ROW. For purposes of this analysis, a 100-foot wide construction ROW was assumed in order to provide findings for use in decisions for issuance of Temporary Use Permits which may be needed in some places. Generally, construction would be limited to the 50 foot ROW.

[b] Assumes an operational ROW of 50 feet, plus the width of the pipe.

[c] Numbers were generally adjusted to the nearest whole.

Table 2-8. MAJOR RIVER CROSSINGS[a] FOR ALTERNATIVE ROUTES

River	County	State	Township	Range	Section	Milepost
Southern Rangely Lateral Alternative (AB)						
White	Rio Blanco	CO	1N	102W	4	41
Northern Rangely Lateral Alternative (DEB)						
White	Rio Blanco	CO	2N	101W	15	26
White River Alternative (CEF)						
White	Rio Blanco	CO	2N	98W	1	10
Yampa River Alternative (GHI)						
Yampa	Moffat	CO	7N	96W	23	23

[a]Of the rivers and streams crossed by the alternative routes, major rivers are identified as those for which the applicant may need to develop a site-specific construction design plan for construction contractor use. At the present time it appears that no river crossings would require a U.S. Army Corps of Engineers' (COE) Section 10 Permit (33 USC 403). As specified by section 404 of the Clean Water Act, individual permits may be required for the crossings of the White and Yampa due to presence of Endangered Species. It is anticipated that the nationwide 404 Permit would apply to the balance of stream and river crossings. The applicant is responsible for obtaining COE-required permits.

Table 2-9. CRITICAL/CRUCIAL WILDLIFE USE AREAS AND PERIODS TO AVOID DURING CONSTRUCTION OF ALTERNATIVES

Milepost	Critical/Crucial Wildlife Use Areas	Dates During Which Construction[1] Would Be Avoided
Southern Rangely Lateral Alternative (AB)		
1.0-5.5	Mule deer critical winter range	December 1 to March 31[a]
6.0	Golden eagle nest	March 1 to July 31[a]
7.0-11.0	Mule deer critical winter range	December 1 to March 31[a]
12.0-12.2	Sage grouse winter concentration area	December 1 to March 31[a]
13.0-15.0	Sage grouse strutting/brooding area	March 1 to May 15[a]
14.0-14.5	Sage grouse winter concentration area	December 1 to March 31[a]
15.0-16.0	Mule deer critical winter range	December 1 to March 31[a]
17.0-19.0	Mule deer critical winter range	December 1 to March 31[a]
18.0	Golden eagle nest	March 1 to July 31[a]
30.0-35.0	Mule deer critical winter range	December 1 to March 31[a]
40.5	Golden eagle nest	March 1 to July 31[a]
Northern Rangely Lateral Alternative (DEB)		
1.5	Golden eagle nest	March 1 to July 31[a]
3.0	Golden eagle nest	March 1 to July 31[a]
4.5 - 14.5	Mule deer critical winter range	December 1 to March 31[a]
23.5	Golden eagle nest	March 1 to July 31[a]
26.0	Golden eagle nest	March 1 to July 31[a]
26.0	Bald eagle winter roosting area	November 15 to April 15[b]
White River Alternative (CEF)		
0.0 - 3.0	Mule deer critical winter range	December 1 to March 31[a]
5.0	Golden eagle nest	March 1 to July 31[a]
6.0 - 10.0	Bald eagle winter roosting area	November 15-April 15[a]
6.2	Golden eagle nest	March 1 to July 31[a]
7.5 - 14.5	Mule deer critical winter range	December 1 to March 31[a]
Yampa River Alternative (GHI) (Including Pump Station)		
0.0 - 1.0	Mule deer critical winter range	December 1 to March 31[b]
6.0 - 10.0	Sage grouse strutting/brooding grounds	March 15 to June 1[b]
20.0 - 33.0	Mule deer critical winter range	December 1 to March 31[b]
22.0 - 23.0	Elk critical winter range and calving area	December 1 to March 31[b]
26.0 - 30.0	Sage grouse strutting/brooding grounds	March 15 to June 1[b]

[1] Unless authorized by appropriate Area Manager.
[a] Stipulations provided by BLM-Meeker, Colorado.
[b] Stipulations provided by BLM-Craig, Colorado.

Table 2-10. PLANS FOR AREAS SUBJECT TO GEOLOGIC HAZARDS ALONG ALTERNATIVE ROUTES

Approximate Mileposts	Areas
Southern Rangely Lateral Alternative (AB)	
31 to 35	Because of the narrowness of the valley and a meandering and steeply incised drainage, the pipeline would have to be located so as to minimze the potential for erosion and undercutting. There would also be a necessity to monitor this area until the drainage and trench backfill had revegetated and stabilized.
White River Alternative (CEF)	
10 to 16	Weak rocks on this alternative route along Colorow Gulch from the White River to Crooked Wash would require careful routing of the pipeline to minimize erosion or undercutting of slopes underlain by relatively weak rocks.
Yampa River Alternative (GHI)	
5 to 6	In this area the GHI Alternative turns slightly toward the northeast and ascends a nearly 1000 ft high slope. The slope is steep and covered by colluvium that in some areas is unstable. A site specific plan by a geotechnical engineer will be required prior to construction. The plan may well require that the colluvium is removed from the path of the trench and spread in areas away from the trench. The resulting disturbance would be significant and might require a 400 to 500 ft wide ROW with a significant and visible scar when restored. The potential for instability would not be entirely removed by the engineer's recommendations and additional monitoring would be required.

as amended (30 USC 185), and in accordance with the regulations in 43 CFR 2880, Oil and Gas Pipelines. The ROW grants would be issued by the BLM Colorado and Wyoming State Offices. Third-party ROWs, i.e., for telephone and electric lines and facilities, would be applied for separately by the utility companies. (Power would be supplied to the origin station by the Public Service Company of Colorado, to the Maybell and Baggs pump stations by Yampa Valley Electric Association, and to the Rawlins pump station by Pacific Power and Light.) These applications would be processed under Title V of the Federal Land Policy and Management Act of 1976 (90 stat 2743;43 USC 1761) and the regulations contained in 43 CFR 2800, "Oil and Natural Gas Pipelines and Related Facilities."

2. Just prior to construction, issuance of approximately 100 temporary use permits for temporary work and storage sites at major drainage crossings, highway and railroad crossings, and other utility crossings. These permits would be issued from the appropriate BLM District Office among the following: Grand Junction, Craig, Rawlins, or Casper.

3. Issuance of an undetermined number of Noncompetitive (Negotiated) Sales of Mineral Material (commercial fill, sand and gravel, and other surfacing or construction material of common variety) under 43 CFR 3611, Noncompetitive Sales. These would be issued by the appropriate BLM District Office.

The BLM is also responsible for compliance with certain applicable federal laws, orders and regulations. For this project they are:

- Endangered Species Act of 1973 (as amended), Section 7, in accordance with 50 CFR 402, Interagency Cooperation
- Executive Order 11593 (Protection and Enhancement of the Cultural Environment) and the Historic Preservation Act of 1966 (as amended), Section 106, in accordance with 36 CFR 800 (Protection of Historic and Cultural Properties)
- Executive Order 11988, Floodplain Management
- Wild Horse and Burro Act

U.S. Army Corps of Engineers (COD). Under Section 404 of the Clean Water Act of 1977 (33 USC 1344), as implemented by Corps of Engineers regulations (33 CFR 323), the placement of dredged or fill material for bedding or backfilling pipeline crossings is permitted under the nationwide permit for utility lines (33 CFR 323.4 and 323.4-3) provided that certain conditions are met. However, the COE does have discretionary authority to require individual permits for all or portions of the pipeline crossings if the District Engineer determines that the concerns of the aquatic environment action (33 CFR 323.4-4).

On the basis of project description information supplied by the applicant, COE District Offices in Sacramento and Omaha will determine whether an individual permit is required. This request for determination has been submitted.

Federal Communication Commission (FCC). The FCC requires application for an operating license for certain microwave communication systems. Should La Sal require the proposed microwave station, it would submit application Form 402 for license in the Operational

Fixed Microwave Service. Authority for issuing the microwave licenses is contained in Volume V, Parts 90 and 94 of 47 CFR of the FCC Rules and Regulations, which govern private repeater stations.

State

The applicant is responsible for identifying and obtaining needed grants and permits from Colorado and Wyoming state agencies. Among these are:

Colorado and Wyoming State Boards of Land Commissioners. Both states have permitting authority over the state lands regarding rights-of-way or other uses of property or resources on state lands. The Departments' jurisdiction includes permitting authority involving new construction of power lines, pump stations, pipelines, access roads, etc. The applicant would be required to obtain these land use permits for an easement across all state lands affected by the proposed pipeline.

Colorado and Wyoming Highway Departments. Permission to bore under highways is needed from the Colorado and Wyoming highway departments.

Other Jurisdictions

Easements and permits from regional and local jurisdictions would be identified and obtained by the applicant from the relevant jurisdiction as applicable. Permission to cross county roads or private rights-of-way would be obtained from the relevant county commissioners or appropriate owner.

SPILL ACCIDENT PARAMETERS

Parameters needed to evaluate the possible impacts of accidental pipeline discharges to the environment include pipeline spill frequencies, spill volumes and rates of discharge. This section discusses sources and causes, historical spills, and predicted spill frequencies and volumes. Accident statistics are available for operating pipelines in the United States from the U.S. Department of Transportation, Office of Pipeline Safety Operations (OPSO). The following accident analysis is derived from these statistics.

Sources and Causes. From 1968 to 1976 (1976 being the latest year for which official statistics were published), the annual number of liquid pipeline accidents has decreased markedly from earlier 10-year periods. The trends in the categories of pipeline accidents can be seen in Table 2-11. More important than the total number of accidents for each cause is the percent of the total, which is independent of the fluctuating number of pipeline miles in operation.

Third-party equipment ruptures of pipelines have replaced corrosion as the major cause of pipeline accidents. Corrosion-induced spills have steadily decreased since 1969, probably as a result of federal regulations requiring that cathodic protection systems be installed on all coated pipelines by March 31, 1973.

Since the La Sal pipeline would be cathodically protected, it would be most accurate to utilize accident data for similarly protected pipelines. However, since data pertaining to total miles of corrosion-protected versus non-protected pipelines are not available from the OPSO, the accident analysis must consider all pipeline types.

The problems associated with the quality of new pipe and its installation, as shown in the above data, are small in number relative to other categories. The percentage of the total accidents caused by incorrect operation by pipeline carrier personnel has steadily increased since 1968, as have accidents

Table 2-11. LIQUIDS PIPELINES - YEARLY ACCIDENT SUMMARY (ALL ACCIDENTS), 1968-1976

Cause	Number of Accidents									Percentage of Total								
	1968	1969	1970	1971	1972	1973	1974	1975	1976	1968	1969	1970	1971	1972	1973	1974	1975	1976
Corrosion	232	172	179	124	100	86	67	72	51	46.5	42.7	51.5	40.2	32.5	31.7	26.2	28.3	24.4
Equipment Rupturing Line	98	90	70	67	69	66	78	73	67	19.7	22.4	20.2	21.8	22.3	24.2	30.5	28.6	32.0
Defective Pipe	36	35	32	31	32	21	20	15	14	7.2	8.7	9.2	10.1	10.4	7.6	7.8	5.9	6.7
Defective Welds	4	3	3	3	5	5	4	5	4	.8	.7	.9	1.0	1.6	1.7	1.6	2.0	1.9
Incorrect Operations	14	13	13	22	22	16	28	22	20	2.8	3.2	3.8	7.1	7.1	6.0	10.8	8.6	9.6
Other	115	90	50	61	81	79	59	68	53	23	22.3	14.4	19.8	26.1	28.8	23.1	26.6	25.4
Total:	449	403	347	308	309	273	256	255	209									

Source: U.S. Department of Transportation, Office of Pipeline Safety Operations.

Note: Yearly accident numbers include all pipeline facilities, including line pipe.

due to vandalism, weather, and equipment failure, all of which are included under the "other" causes category.

Predicted Spill Frequency. Accurate spill frequency predictions are difficult to assess for new instaliations due to the nature of the available data base. As discussed previously, the data base includes all operating liquid pipelines regardless of age or construction methods used, if any, to minimize spills. Therefore, the following spill frequency predictions can be considered as conservative estimates.

Simple calculations of spill frequencies in the form of total accidents expected per mile of pipeline per year can be made by dividing the number of accidents in a given year with the number of existing pipeline miles in operation. Utilization of several years of data will give a more representative number of spills. Table 2-12 lists the spill frequencies for all liquid pipelines for the years 1968-1975. As the data show, the spill frequency rate has decreased by over 50 percent during this period even though the total mileage of pipeline in operation has increased slightly. This can be attributed to older pipelines being taken out of service and the increasing use of cathodic protection systems and coated pipe to inhibit corrosion, one of the leading causes of pipeline leaks.

When the annual accident-per-mile data versus the yearly data from Table 2-12 are fitted to a power law equation, the trend in accidents per mile is easily seen. This trend would indicate that annual rates on the order of 0.001 accidents per mile of pipeline will be the norm for the mid-1980s. Because the La Sal pipeline would be new, it is expected that it would not have any greater yearly accident rate than the predicted national annual rate of 0.001 per mile. Therefore, using the national average for all pipelines and approximately 314-320 miles of pipeline in the La Sal case, the average leak frequency would be on the order of one leak every three years for the system. In interpreting this number, one must keep in mind that the La Sal system would be new and would utilize state-of-the-art technology. Therefore, it should be in a position to operate at less than this frequency.

Predicted Spill Magnitudes. Spill magnitude predictions involving the La Sal pipeline are based primarily on the total throughput of the system. Studies by Beyer and Painter (1977) and others have indicated that pipeline spill magnitudes are more closely related to the total throughput of the pipeline than the quantity spilled versus number of accidents in a given year or set of years. Utilizing this approach, Beyer and Painter have developed the following formula for determining spill magnitudes.

$$Qy = 3.6 \times 10^{-6} \text{ MMB} \times \text{yearly throughput (bbl)}$$

where: Qy = Barrels spilled
MMB = Volume in millions of barrels

Using the projected throughput of 54.75 MMB per year at 150,000 barrels per day, the predicted total magnitude of spills in a given year is approximately 200 barrels. Carrying it one step further and using the predicted spill frequency of 0.3 spills per year, the average spill size would be expected to be 60 barrels.

Maximum Credible Spill Size. An operational event involving maximum spillage would require total severing of the pipeline. Although highly improbable, such an event could occur as a result of accidental damage during excavation near the alignment, improper operation, stream washouts, or sabotage. The pipeline system has been designed to minimize such losses through leak

Table 2-12. REPORTED LINE PIPE ACCIDENTS ALL CAUSES - ALL PRODUCTS

Year	Reported Number of Accidents[a]	Reported Number of Trunk Pipeline Miles	Accidents Per Mile
1968	421	115,238	.0037
1969	350	117,983	.0030
1970	288	122,365	.0024
1971	258	122,471	.0021
1972	235	124,458	.0019
1973	194	122,354	.0016
1974	199	126,211	.0016
1975	180	121,278	.0015
1976	169	b	b

Source: National Transportation Safety Board 1978.

[a]Note that these figures are for line pipe only and do not include pump station or related facilities accidents.

[b]Data not yet available from ICC Part 6 Report.

detection instrumentation, remotely operating pump shutdown equipment, strategically located check valves, manual block valves, and remotely The maximum credible spill size at any point in the line is therefore a function of the pumping loss incurred during the time between leak detection and and the volume of oil that can drain from the line before and after automatic and manual valves are closed.

Five scenarios have been evaluated to illustrate typical maximum credible spill losses. The sites of the spills are in the Piceance Creek area (MP 16.3), at the White River crossing (MP 37.2), at the Yampa River crossing (MP 71.0), at the alternative Yampa River crossing (GHI MP 22.7), and at the Sweetwater River crossing above the Pathfinder Reservoir (MP 235.0). For each scenario the following assumptions have been made:

- After instrumental leak detection, 2 minutes will be required to react and terminate pumping.
- Under the influence of gravity alone, approximately 1/4 mile of pipe will drain every 60 minutes.
- The average time required to travel to and shut remote manual block valves will be approximately 4 hours.
- Where block and check valve locations were not established, they were assumed to be located at points having existing vehicular access.

Based on these assumptions the maximum credible spill sizes for each scenario have been calculated and shown in Table 2-13.

In actual practice the predicted spill sizes could be further reduced through evacuation of sections of the pipeline below the break by continued pumping and through lesser response times.

SUMMARY OF SIGNIFICANT IMPACTS

Table 2-14 reflects summary findings from the various impact assessments. The summary of findings, however, must be interpreted in conjunction with the descriptions of impacts in the text of Chapter Four of the DEIS or Background Reports. The keyed symbols on Table 2-14 are merely a guide to what is described in the texts. In several instances, for example, the indicated significant impact may refer to only one location along the entire proposed ROW. Findings of "no impact" or "no significant impact" are documented in the Background Reports.

MITIGATION NOT OTHERWISE INCLUDED IN THE PROPOSED ACTION

Mitigating measures were identified through impact analysis. Many of these were incorporated by the applicant in Chapter Two as special construction practices or resource protection methods which would be implemented to help reduce adverse impacts. The following mitigation measures are proposed by the BLM.

Social and Economic Conditions

Construction. The potentially negative social and economic impacts associated with the proposed action during the construction phase would be short-term. These impacts could be avoided completely if construction contractors hired only local labor, but it is highly unlikely that the number of skilled workers needed for pipeline construction would be available locally at the time of construction. Impacts on community facilities and services identified for the construction phase of the proposed

Table 2-13. CALCULATED CREDIBLE MAXIMUM SPILL SIZES (IN BARRELS)[a] FOR SELECTED SCENARIOS

Scenario	Loss Prior to Pump Shutdown	Drainage Loss Prior to Block Valve Closure	Drainage Loss Following Block Valve Closure[b]	Total Loss (Approx.)
Piceance Creek	210	1320	1320	2850
White River	210	1320	790	2320
Yampa River	210	1320	1510	3040
Yampa River Alternative	210	1320	720	2250
Sweetwater River	210	1320	1050	2580

[a]One barrel equals 42 gallons.

[b]Pipeline volume between the block valve and check valve.

Table 2-14. SUMMARY OF IMPACTS FOR PROPOSED ACTION AND ALTERNATIVES

Impact Topics	Proposed Action			Alternative Segments						No Action
				Comparison One		Comparison Two		Comparison Three		
	Trunkline	Pump Stations	Operation	AB Southern Rangely	DEB Northern Rangely	CDF White Proposed	CEF White Alternative	GI Yampa Proposed	GHI Yampa Alternative	
Climate	0	0	0	0	0	0	0	0	0	0
Air Quality	NS	NS	NS	NS	NS	NS	NS	NS	NS	0
Geologic Hazards	NS	NS	NS	NS	NS	NS	NS	NS	NS	0
Paleontology	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	0
Mineral Resources	0	0	0	0	0	0	0	0	0	0
Soils	NS	NS	NS	NS	NS	NS	NS	NS	NS	0
Water Resources	NS	NS	NS	NS	NS	NS	NS	NS	NS	0
Vegetation	(-)	NS	NS	NS	NS	NS	NS	(-)	NS	0
Wildlife	(-)	NS	(?)	(-)	NS	NS	NS	(-)	NS	0
Cultural	(?)	(?)	NS	(?)	(?)	(?)	(?)	(?)	(?)	0
Visual	(-)	NS	NS	(-)	NS	(-)	(-)	NS	NS	0
Noise	NS	NS	NS	NS	NS	NS	NS	NS	NS	0
Recreation	NS	NS	0	NS	NS	NS	NS	NS	NS	0
Wilderness	0	0	0	0	0	0	0	0	0	0
Livestock Grazing	NS	NS	NS	NS	NS	NS	NS	NS	NS	0
Agriculture	NS	NS	NS	NS	NS	NS	NS	NS	NS	0
Land Use Controls and Constraints	0	0	0	0	0	0	0	0	0	0
Transportation Networks	NS	NS	0	NS	NS	NS	NS	NS	NS	0
Social and Economic Conditions	CUM	CUM	CUM	CUM	CUM	CUM	CUM	CUM	CUM	(-)
100-Year Floodplains	NS	NS	NS	NS	NS	NS	NS	NS	NS	0
Threatened or Endangered Species	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	0
Wild Horses	0	0	0	0	NS	0	0	0	0	0
Prime and Unique Farmland	NS	(?)	(?)	NS	NS	NS	NS	(?)	(?)	0
Energy Use	NS	NS	(+)	NS	NS	NS	NS	NS	NS	(-)
Spill Effects	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	0

Key: (-) significant adverse impact, (NS) no significant impact, (+) significant beneficial impact, (?) unknown significance, (0) no impact, (CUM) significant impact due to cumulative effects of anticipated simultaneous developments.

action could be mitigated in a number of ways:

1) The applicant could reserve existing local hotel/motel facililities, or mobile home and recreational vehicle spaces, well in advance of construction to ensure that local temporary accommodation will be available when it is needed, or

2) The applicant could accommodate workers in areas where housing is available, e.g., Casper, Battlement Mesa, or winter resort area, and arrange an efficient means of transporting workers longer distances to worksites, or

3) The applicant could assume responsibility for providing temporary accommodation to construction workers, e.g., a self-contained camp, preferably with some entertainment and recreation facilities

These measures would help reduce or eliminate the short-term impacts of project construction in affected communities.

Operation. Even though the anticipated operation phase workforce is small, the majority of operation workers would want to settle in Meeker, a town that may be experiencing a development boom over the next decade. Potential impacts were considered significant solely because of the cumulative demands of simultaneous developments. Accommodating the needs of even 25 families is difficult when community facilities and services have virtually no excess capacity.

The applicant could mitigate operation phase impacts by the following:

1) Ensure that local officials and planners responsible for long-range planning of community facilities and services are kept informed of anticipated workforce size and scheduled arrival.

2) Provide information and assistance, if desired, to Rio Blanco County and the town of Meeker to help them prepare applications for loans and grants for needed services and facilities.

3) Work with other companies in the area to identify possible cooperative programs that could help Meeker and Rio Blanco County offset negative social and economic impacts resulting from simultaneous resource development projects.

Other mitigation measures may be desirable to facilitate the housing of operation employees if the housing situation in Meeker is critical in 1985-86. At this time it is impossible to predict accurately housing supply and demand for these years.

CHAPTER THREE
AFFECTED ENVIRONMENT

Impacts from the proposed action and alternatives were analyzed for all of the following resources:

- Climate
- Air Quality
- Geology (geologic hazards)
- Mineral Resources
- Paleontology
- Soils
- Water Resources
- Vegetation
- Wildlife
- Cultural Resources
- Visual Resources
- Noise
- Land Use
  - Agriculture
  - Forests
  - Livestock Grazing
  - Recreation
  - Wilderness
- Land Use Controls and Constraints
- Transportation Networks
- Social and Economic Conditions

In addition to these, several special topics are addressed in accordance with specific guidance or regulations. These are: Prime and Unique Farmlands; 100-year Floodplains; Threatened or Endangered Species; Wild Horses; Wilderness Resources; Energy Use; and Land Use Controls and Constraints. General topics analyzed are summarized in Table 3-1 and elaborated in Appendix B.

Topics for which significant impacts were determined from analysis or are unknown at this time or are required by special guidance are included in Chapters Three and Four. Criteria by which significant impacts were determined are presented for all resources in Appendix B (Frameworks for Analysis and Significance Criteria). In accordance with guidance provided in the Frameworks for Analysis, the analyses were conducted and are documented in Background Reports. These are on file at the following BLM offices: Colorado and Wyoming State; Craig, Rawlins and Casper Districts; and Meeker and Little Snake Resource Areas.

Background Reports were provided for the following resources:

- Climate, Air Quality and Noise
- Geologic and Seismic Hazards
- Mineral Resources
- Paleontology
- Soils and Prime Agriculture
- Surface Water
- Vegetation
- Wildlife
- Aquatics
- Livestock Grazing
- Recreation and Wilderness
- Social and Economic Conditions
- Energy Use
- Oil Spill Analysis

PROPOSED ACTION AND ALTERNATIVES

Baseline data presented in this chapter reflect those resources for which impacts were found or anticipated to be significant or are unknown. The special topics listed above are also included. Baseline information is not repeated for the alternatives where it is identical to that for the proposed action.

Paleontology

Tables 3-2 and 3-3 list potentially significant paleontological resources identified along the proposed trunkline and alternative routes. Table 3-4 indicates the total mileages identified for each of four categories of potential paleontological resources along the proposed trunkline and alternatives.

Water Resources

The proposed trunkline route would cross numerous washes, creeks, streams, and rivers, including both intermittent and perennial watercourses. Table 3-5

Table 3-1. ENVIRONMENTAL RESOURCES AND IMPACT TOPICS ANALYZED

- Climate
- Air Quality
  1. fugitive dust from construction
  2. emissions from pump stations
  3. nonattainment areas
- Geologic Hazards
  1. subsidence
  2. landsliding and other soil hazards
  3. fault rupture
- Paleontology
  1. areas of known or potential fossils of scientific value
  2. areas of high potential for exceptional scientific fossils
- Mineral Resource
  1. conflicts with present or future use
- Soils
  1. soil types and characteristics
  2. soil erosion susceptibility
  3. slope, emission control
  4. areas with undesirable soil characteristics
  5. potential reclamation problems and measures
- Water Resources
  1. construction impacts on water quality (suspended sediment)
  2. operation impact on surface and groundwater quality (spills)
  3. floodplains
- Vegetation
  1. vegetative types
  2. unique species
  3. production losses
  4. revegetation measures
  5. riparian vegetation
  6. compliance with Endangered Species Act, Section 7
- Wildlife
  1. game/non-game species
  2. crucial habitats
  3. amount of habitat disturbance
  4. season of use
  5. aquatic habitat and effects from accidental spills
  6. wild horses
     a. habitat disturbance
     b. sensitivity to disturbance
- Wildlife (continued)
  7. compliance with Endangered Species Act, Section 7
- Cultural
  1. areas with resources on or eligible for NRHP
  2. areas where resources may be located
- Visual
  1. VRM classes
  2. short-term adverse impacts
  3. long-term adverse impacts
- Noise
  1. construction impacts
  2. operational impacts
- Land Use
  1. agriculture
     a. commercial forestry
     b. prime and unique farmlands
     c. effects from accidental spill
  2. livestock grazing
     a. production loss
  3. recreation
     a. site inventory
     b. access
     c. dispersed use areas
  4. wilderness
- Transportation Networks
  1. disruption
- Social and Economic Conditions
  1. population trends
  2. employment conditions
  3. indicators of economic well-being
  4. fiscal status
  5. housing and community services
  6. intercity transportation
- Energy Use
  1. energy used to construct and operate the pipeline versus energy transported by the pipeline
- Land Use Controls and Constraints
  1. federal, state and local land use plans

Table 3-2. CLASSIFICATION OF POTENTIALLY SIGNIFICANT FOSSIL LOCATIONS ALONG THE PROPOSED TRUNKLINE

Milepost	Fossil Type	Nearby Locality Source
7.0 - 13.0	Vertebrates, Invertebrates	
13.0 - 13.2	Vertebrates	Kihm 1981
13.6 - 13.8	Vertebrates	Kihm 1981
15.1 - 15.3	Vertebrates	Kihm 1981
15.5 - 15.55	Vertebrates	Kihm 1981
15.9 - 16.1	Vertebrates	Kihm 1981
16.45 - 16.6	Vertebrates	Kihm 1981
17.65 - 18.1	Vertebrates	Kihm 1981
17.3 - 17.55	Vertebrates	Kihm 1981
18.65 - 18.95	Vertebrates	Kihm 1981
19.5 - 19.6	Vertebrates	
19.95 - 20.4	Vertebrates	
34.0 - 36.7	Invertebrates	Kihm 1981
36.7 - 37.0	Invertebrates	
37.5 - 37.6	Invertebrates	
41.25 - 41.55	Vertebrates	
41.95 - 42.05	Vertebrates	
42.2 - 42.55	Vertebrates	
55.4 - 56.1	Vertebrates	
57.0 - 57.7	Vertebrates	
84.95 - 85.05	Vertebrates	
89.35 - 89.6	Vertebrates	
90.15 - 90.35	Vertebrates	
92.8 - 92.9	Vertebrates	
95.0 - 95.1	Vertebrates	
101.55 - 101.65	Vertebrates	
102.0 - 102.2	Vertebrates	
106.0 - 108.0	Vertebrates	University of CA, Berkeley Museum of Paleontology
111.0 - 141.0	Vertebrates	Unpublished
214.5 - 218.5	Vertebrates	Unpublished

Sources: Kihm, Allan. 1981. Personal communication with Elizabeth McReynolds, Grand Junction BLM.

University of California, Berkeley, Museum of Paleontology, specimen locality maps.

Table 3-3. CLASSIFICATION OF POTENTIALLY SIGNIFICANT FOSSIL LOCATIONS ALONG ALTERNATIVE PIPELINE ROUTES

Milepost	Fossil Type	Nearby Locality Source
Southern Rangely Lateral Alternative (AB)		
0.8 - 0.95	Vertebrates	
1.4 - 1.5	Vertebrates	
6.7 - 7.0	Vertebrates	Kihm 1981
7.05 - 7.15	Vertebrates	Kihm 1981
7.9 - 8.0	Vertebrates	Kihm 1981
12.95 - 13.05	Vertebrates	
13.4 - 13.5	Vertebrates	
16.6 - 16.65	Vertebrates	
16.8 - 16.85	Vertebrates	
17.35 - 17.4	Vertebrates	
17.5 - 17.6	Vertebrates	
22.7 - 22.9	Vertebrates	
25.2 - 25.7	Vertebrates	
26.45 - 26.7	Vertebrates	
27.7 - 27.85	Vertebrates	
Northern Rangely Lateral Alternative (DEB)		
8.3 - 8.5	Vertebrates	
21.45 - 21.5	Vertebrates	
24.4 - 24.65	Vertebrates	
25.0 - 25.2	Vertebrates	
25.4 - 25.55	Vertebrates	
25.85 - 25.9	Vertebrates	
26.95 - 27.1	Vertebrates	
27.3 - 27.5	Vertebrates	
27.7 - 27.8	Vertebrates	
29.3 - 29.5	Vertebrates	
White River Alternative (CEF)		
13.1 - 13.2	Vertebrates	
14.4 - 14.5	Vertebrates	
Yampa River Alternative (GHI)		
0.75 - 1.2	Vertebrates	
4.9 - 5.6	Vertebrates	
8.4 - 8.9	Vertebrates	
9.9 - 10.5	Vertebrates	

Source: Kihm, Allan. 1981. Personal communication with Elizabeth McReynolds, Grand Junction BLM.

Table 3-4. TOTAL MILES OF POTENTIALLY SIGNIFICANT FOSSILS

Pipeline Route	Classification I	II	III	IV	Total
Proposed Trunkline	2.7	10.15	38.0	0	50.85
Southern Rangely Lateral Alt.	0	1.8	0.5	0	2.3
Northern Rangely Lateral Alt.	0	1.55	0	0	1.55
White River Alt.	0	0.2	0	0	0.2
Yampa River Alt.	0	2.25	0	0	2.25

I - Fossiliferous areas along the pipeline route for which there are undisturbed areas elsewhere with similar fossil assemblages.

II - Localities along the pipeline route near localities known to contain fossils of significant value.

III - Localities along the pipeline route known to contain or with high potential for containing fossils of significant scientific value, and for which detailed references are lacking.

IV - Fossiliferous or potentially fossiliferous areas of extremely high and irreplaceable scientific value.

Table 3-5. LOCATION AND CLASSIFICATION OF STREAM CROSSINGS FOR PROPOSED TRUNKLINE

Stream Crossings[a]	State	Approximate Milepost	Stream Classification[b]	Beneficial Uses
Major Perennial				
White River	Colorado	37	Unclassified	AQU (Warm water); REC2; SUP; AGR
Yampa River	Colorado	71	Unclassified	AQU (Warm water); REC2; SUP; AGR
Little Snake River	Colorado	110	Unclassified	AQU (Cold water): REC1; SUP; AGR
Minor Perennial				
Stewart Gulch	Colorado	15	Unclassified	Not Determined
Piceance Creek	Colorado	16,30,33	Unclassified	Not Determined
Muddy Creek	Wyoming	135	III	FISH (Cold water non-game); REC2; IRR; SWL
Separation Creek	Wyoming	180	IV	SWL
Sweetwater River	Wyoming	234	II	FISH (Cold water game); REC2; IRR; SWL
Horse Creek	Wyoming	239	II	FISH (Cold water game); REC2; IRR; SWL
Fish Creek	Wyoming	243	II	FISH (Cold water game); REC2; IRR; SWL
Casper Canal	Wyoming	265	IV	IRR
Poison Spider Creek	Wyoming	269	IV	SWL

LEGEND

Beneficial Uses
- FISH Fishery
- AQU Aquatic Life
- REC1 Primary Contact Recreation
- REC2 Secondary Contact Recreation
- SUP Domestic Water Supply
- AGR Agriculture
- IRR Irrigation
- SWL Stock and Wildlife Watering

Stream Classification

The State of Colorado classifies streams only by the designated beneficial uses, and does not have numerical classifications.

The State of Wyoming classifies streams as Class I (highest quality, no further degradation allowed); Class II (game fish); Class III (non-game fish); and Class IV (poorest quality and not suitable for any fish life.)

[a] Stream crossings identified on U.S. Geological Survey topographic maps (1:250,000 scale).
[b] Source: Wagner 1981; Anderson 1981; Squire 1981.

lists the name and location of all perennial streams and rivers that would be crossed by the proposed trunkline. The route would cross three major perennial rivers. These are the White, Yampa, and Little Snake rivers, all in Colorado. The route would also cross three tributaries of the Pathfinder Reservoir in Wyoming. These are the Sweetwater River, Fish Creek, and Horse Creek. Table 3-6 lists the perennial streams and rivers that would be crossed by the alternative routes.

Surface waters in Colorado and Wyoming are classified according to the beneficial uses for which they are presently suitable or are intended to become. Tables 3-5 and 3-6 also show the stream classifications and beneficial uses of all perennial streams and rivers crossed by the proposed trunkline and alternatives. Surface water quantity and quality data are available for several of the perennial crossings (U.S. EPA 1981). Table 3-7 presents certain water quality characteristics for these crossings.

Vegetation

All vegetation types traversed by the proposed action were considered in this analysis. A discussion of the composition of these types, distribution along the proposed action, and total acres within the region of the proposed action is detailed in the Background Report.

The significance of construction and operation impacts to vegetation types represented along the proposed trunkline and alternative routes was determined after consideration of criteria detailed in the Framework for Analysis (Appendix B). Basic components of the criteria include: percent removed, length of disturbance, and nature of the impact. Based on evaluation of data in terms of these criteria, one area has been identified as potentially being affected significantly. Between MP 72-80 riparian vegetation borders the Spring Creek drainage. This section of Spring Creek is perennial/spatially intermittent and supports a relatively well developed riparian flora. Common species include: willow, sedges, and alkali sacaton.

Wildlife

The species and species groups identified for inclusion in this analysis include big game, game birds, waterfowl, raptors, sensitive species, and endangered or threatened species. (Sensitive species include those receiving management priority by the BLM. These species are included on such lists as the Migratory Birds of Federal High Interest and the Colorado Resident Species of High Interest.) These groups of species were identified because of high public interest and funds generated, legislative protection, management priority by resource agencies, and their susceptibility to impacts resulting from the proposed trunkline and alternative routes.

The potential conflict of construction activities and habitat removal in known crucial areas was identified as being a potentially significant impact. Crucial or critical areas are defined as those areas important to the maintenance and perpetuation of wildlife populations. Generally these areas are characterized by population concentrations during critical periods, e.g., winter range, breeding, or brooding grounds. Within these areas, populations are very susceptible to human disturbance, and effects on individuals may result in the loss of several generations of progeny.

The significance of construction and operation impacts to critical/crucial areas was considered with respect to criteria detailed in the Framework for Analysis (Appendix B). Based on these criteria, several wildlife resources in specific crucial/critical areas were

Table 3-6. LOCATION AND CLASSIFICATION OF STREAM CROSSINGS FOR ALTERNATIVE ROUTES

Stream Crossings [a]	State	Approximate Milepost	Stream Classification [b]	Beneficial Uses
Southern Rangely Lateral Alternative (AB)				
Major Perennial				
White River	Colorado	41	Unclassified	AQU (Warm water); REC2; SUP; AGR
Minor Perennial				
Piceance Creek	Colorado	6	Unclassified	Not Determined
Yellow Creek	Colorado	13	Unclassified	Not Determined
Duck Creek	Colorado	17	Unclassified	Not Determined
Spring Creek	Colorado	28	Unclassified	Not Determined
Northern Rangely Lateral Alternative (DEB)				
Major Perennial				
White River	Colorado	26	Unclassified	AQU (Warm water); REC2; SUP; AGR
Minor Perennial				
Yellow Creek	Colorado	8	Unclassified	Not Determined
Fletcher Gulch	Colorado	22	Unclassified	Not Determined
Spring Creek	Coloardo	24	Unclassified	Not Determined
White River Alternative (CEF)				
Major Perennial				
White River	Colorado	10	Unclassified	AQU (Warm water); REC2; SUP; AGR
Yampa River Alternative (GHI)				
Major Perennial				
Yampa River	Colorado	23	Unclassified	AQU (Warm water); REC2; SUP; AGR

LEGEND

Beneficial Uses
- AQU Aquatic Life
- REC2 Secondary Contact Recreation
- SUP Domestic Water Supply
- AGR Agriculture

Stream Classification
The State of Colorado classifies streams only by the designated beneficial uses, and does not have numerical classifications.

[a] Stream crossings identified on U.S. Geological Survey topographic maps (1:250,000 scale).
[b] Source: Wagner 1981; Anderson 1981; Squire 1981.

Table 3-7. WATER QUALITY CHARACTERISTICS AT STREAM AND RIVER CROSSINGS

Stream or River	Gaging Station No.	Temperature (°C)			Dissolved Oxygen (mg/l)			Suspended Solids (mg/l)		
		Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
Stewart Gulch (mouth)	09306028	-	0.0	-	-	-	10.5	2,590	97	460
Piceance Creek (Rio Blanco)	09306007	25.0	0.0	9.5	-	6.2	-	6,500	100	1,530
Piceance Creek (White River)	09306	30.0	0.0	9.1	16.2	4.9	9.7	5,300	40	1,610
White River (Piceance)	000117	25.6	0.0	7.7	-	1.1	11.7	91,500	0	1,200
White River (Rangely)	09306300	29.0	0.0	10.9	13.4	5.8	9.3	43,400	17	2,400
Poison Spider	06643900	28.7	0.0	9.4	14.6	6.7	10.3	4,080	1,040	1,490
Pathfinder Reservoir (Sweetwater Arm)	06639600	20.0	13.5	16.6	10.0	3.2	6.7	350	290	310
Sweetwater River	06639000	27.2	0.0	8.3	12.4	6.3	9.7	240	4	41
Yampa River (Maybell)	000039	24.4	0.0	7.9	15.0	7.8	10.6	575	55	310

Source: U.S. EPA STORET Inventory 1981.

identified as having the potential to be significantly affected by construction of the proposed trunkline and alternative routes. Descriptions of these resources are summarized below. Background documentation for the assessment of these issues, as well as for other wildlife resources for which no potential significant impacts were identified, is accessible in the Background Report.

Proposed Trunkline. MP 4.5-11.0 - Elk Critical Winter Range. The area between MP 4.5-11.0 is within elk critical winter range. Critical winter range is important for herd survival since these areas are where elk concentrate during the most severe winter weather. Generally, elk critical winter range is located at low elevations where snow depth is not substantial and therefore allows relatively free movement and allows browse to remain available above the snow pack. All of these factors are present in the region of MP 4.5-11.0; therefore, the area is defined as critical winter range.

The area bordering Spring Creek (MP 72-80) is designated as crucial riparian habitat because it is an important source of food, water, and cover for a variety of wildlife. In particular, it serves as important brooding habitat for nearby sage grouse populations.

Southern Rangely Lateral Alternative. The area between MP 30-35 is within deer critical winter range. Critical winter range is important for herd survival since deer concentrate in these areas during the most severe winter weather. Deer critical winter range (as discussed for elk), is generally located at low elevations where snow depth is not substantial and therefore allows relatively free movement and allows browse to remain available above the snow pack. All of these factors are present in the region of MP 30-35.

The total number of deer that use this critical winter range is estimated at 100 and density/square mile is estimated at 165.8 (based on Colorado Division of Wildlife 1040 Distribution Maps). Population status is considered fair and biological status is considered good.

Threatened and Endangered Species

Trunkline and Rangely Laterals. As provided by 50 CFR 402 (Inter-agency Cooperation - Endangered Species Act [ESA] of 1973), the Fish and Wildlife Service (FWS) is required to furnish, at BLM's request, a list of those species, both proposed and listed, that may be or are present in the area involving a federal action.

Upon receipt of the FWS species list, the BLM is required to conduct a biological assessment for the purpose of determining whether those species may be affected by the proposed action or alternatives. Proposed species are included on the list even though they do not have legal protection under the ESA. Their inclusion recognizes that they may be listed at any time, and if not considered they would represent a potential source of future delays or modifications to the proposed action. In light of this, a biological assessment will also be conducted on those species proposed for federal listing.

The biological assessment will be completed within 180 days after receipt of the species list, unless it is mutually agreed upon to extend this period. The biological assessment should include: the results of a comprehensive information survey, results of any studies undertaken to determine the nature and extent of any impacts on identified species, consideration of the cumulative effects upon the species or its critical habitat, study methods used, difficulties encountered in obtaining data and completing the

proposed study, conclusions including recommendations as to further studies, and any other relevant information. In essence, the biological assessment is synonymous with the impact analysis conducted for any other resource that may be affected by the proposed trunkline and alternative routes. If the findings of the biological assessments indicate that a listed or proposed species may be affected, the BLM is required to formally request consultation with the FWS.

A list of federally protected species has been provided by the FWS and is included in Table 3-8.

BLM policy states that only species which are both state-listed and legislatively protected Threatened and Endangered (T&E) be given consideration equal to federally listed T&E species. Wyoming does not have a list of species that are legislatively protected. Colorado does have a listing of essential habitat for T&E wildlife in the state, which is included in Table 3-8.

Cultural Resources

A synoptic BLM Class I inventory for prehistory and history has been conducted for the proposed project by Metcalf-Zier Archaeologists, Inc. and Western Heritage Conservation, Inc. The inventory provides a synthesis of the cultural history of the project area as well as a compilation of previously recorded resources within a one-mile-wide study area centered on the proposed trunkline and alternative routes. By compiling data on known resources within this study area, an indication may be found as to types of sites that can be expected, areas that have been previously inventoried, and areas that may be sensitive for cultural resources. Areas sensitive for cultural resources are those areas with a known or potentially high site density, areas with resources included on or eligible for inclusion on the National Register of Historic Places (NRHP), and areas where insitu subsurface resources and rock art may be located with respect to topographic and/or ecological conditions.

The region through which the proposed project passes has been inhabited periodically since Paleo-Indian time (11,000 years before present). The inventory indicates that 138 previously recorded resources are located in the study area. Of these sites, 106 are prehistoric sites, the majority of which are camps and lithic scatters. Other site types are stone circles and alignments, quarry sites, and a wickiup. Thirty-two of the sites are historic sites that include structures, sheep camps, townsites, trail stations, and trails. One site has both historic and prehistoric material.

Areas where prehistoric resources may be located are near water sources, such as playa lakes, springs, and perennial and intermittent drainages and their confluences; at areas close to subsistence resources such as game trails, wild plants, and tool raw materials; near features which provide shelter from wind and weather; at areas with a sufficient elevation to provide a view point to watch for game and people; and at areas of topographic breaks, such as escarpments and broken hills. Sand dunes have a high potential for containing sites because of their specialized ecology. In highland areas (pinyon-juniper/ponderosa pine), sites have a high likelihood of occurring within 100 meters of a water source and at a slope of less than 20 percent. In the lowland areas (sagebrush/greasewood-saltbush), sites have a high likelihood of occurring with 100 meters of water and on slopes of less than 15 percent.

Locations within the project study area where prehistoric resources can be expected are the Great Divide Basin and Ferris Mountain area, which have sand dunes, playa lakes, and escarpments; the

Table 3-8. FEDERALLY LISTED THREATENED, ENDANGERED, PROPOSED AND CANDIDATE SPECIES THAT MAY OCCUR ALONG OR NEAR THE PROPOSED TRUNKLINE AND ALTERNATIVES

Species[a]	Status	Potential Habitat[b]	General Location of Known Occurrence	State
PLANTS				
Penstamen yampaensis	Candidate[c] species	Alluvial flood-plain/coarse to cobble soils - Big Sagebrush/ Grassland	Near Sunbeam approximately 5 miles west of proposed corridor	Colorado
Astragalus lutosus	Candidate species	Green River formation - shale/scree slopes throughout Piceance Basin	Near junction of Dry Fork Piceance Creek and Piceance Creek	Colorado
Aquilegia barnebyi	Candidate species	Moist cliffs and crevices, on limestone or where alkaline deposits seep down from above, often in shaded situations or under waterfalls, 6,000-9,000 ft.	West-central and southwestern Colorado in Rio Blanco and Garfield Counties	Colorado
Sestuca dasyclada	Candidate species	Rocky slopes	Garfield County Roan Plateau	Colorado
Rorippa calycina	Candidate species	Sandy shores near highwater marks - potential habitat near Sweetwater River crossing	Near Seminole Reservoir	Wyoming
Eriogonum lagopus	Candidate species	Tops of barren clay hills and ridges, near Lovell, Wyoming; seen growing in purplish slate that caps barren brown hills, 4,000-6,000 ft.	Plains on both slopes of the Big Horn Mountains	Wyoming
WILDLIFE				
Bald eagle	Endangered	Nesting habitat-large, open trees adjacent to rivers or lakes	Three miles west of proposed corridor on the Little Snake River	Colorado and Wyoming
		Winter concentration areas - roosting/perching habitat bordering the White River	From the confluence of the Piceance Creek and White River to Rangely	
Black-footed ferret	Endangered	Prairie dog towns	No reported sightings near the proposed corridor	Colorado and Wyoming

Table 3-8. (concluded)

Species[a]	Status	Potential Habitat[b]	General Location of Known Occurrence	State
WILDLIFE (cont.)				
Colorado River squawfish	Endangered	Larger tributaries of the upper Colorado River. Adults are found in mainstream pools; larvae and juveniles inhabit quiet backwaters[d]	White River - near the mouth of Piceance Creek; Yampa River - near the town of Maybell	Colorado
Peregrine falcon[e]	Endangered	Potential nesting habitat - precipitous cliffs in the Grand Valley area	Grand Valley, Parachute Creek drainages	Colorado
Humpback chub	Endangered	Larger tributaries of the upper Colorado River. Adults seem to prefer areas of swift current, often in canyons; young inhabit quiet backwaters[d]	Yampa River-near Juniper Spring	Colorado

[a]Species noted have the potential for occurrence within the study corridor.

[b]Habitat most often associated with the listed species.

[c]Category 2 (Candidate species). Taxa for which information now in the possession of the Service indicates the probable appropriateness of listing as Endangered or Threatened, but for which sufficient information is not presently available to biologically support a proposed rule. Further biological research and field study will usually be necessary to determine the status of the taxa included in this category.

[d]It has not been established whether spawning and/or rearing habitat is present near proposed river crossings.

[e]The peregrine falcon is both state listed and legislatively protected in Colorado. This species did not appear on the FWS list for this project.

area paralleling the escarpment along Muddy Creek; at crossings and confluences of rivers and their tributaries, such as the Little Snake, Big Hole Gulch, Yampa, Sweetwater, and White; and in any area of pinyon-juniper.

Areas sensitive for historic resources are those at or near historic trails, because the site-specific location of the trails--in relation to an engineered-surveyed pipeline routeand their condition at pipeline--route cross ings are unknown at the present time. Cattle and sheep camps and ranches may be found in river valleys. One site in the study area, the Oregon Trail, is on the NRHP. One site, the Overland Trail, has been determined eligible for the NRHP. Historic sites in the study area that may be potentially eligible are discussed under the trunkline and alternative routes.

Information from site forms indicates that many prehistoric resources may be eligible for the NRHP. Field recommendations given as to potential eligibility (if available at all) were inconsistent through time and between investigators, however.

The number of cultural resources within the one-mile-wide study area associated with the trunkline and each alternative route is presented below. Some resources are associated with the study area of more than one component; therefore, the total of the resources presented for each component is more than the 138 resources associated with the entire project study area.

Proposed Trunkline. A total of 106 cultural resources are known to be located in the one-mile-wide study area: 80 are prehistoric (13 in Colorado, 67 in Wyoming); 25 are historic (6 in Colorado, 19 in Wyoming); and one site in Wyoming has both prehistoric and historic components.

A number of transportation-related historic resources may be eligible for the NRHP. In Colorado, the trunkline crosses (MP 16 and 33) an unnamed stage road (52/07/0010) paralleling Piceance Creek; crosses (MP 37) the generalized route of Fremont's Third Expedition (52/04/0002) in 1845; crosses and parallels (MP 86-87 and MP 99-109) the Thornburg Wagon Road (41/03/0002), an unimproved dirt road in this area. In Wyoming, the trunkline parallels (MP 117-130) the generalized route of the Rawlins-White River Road (no site number) which is County Road 789 in this area; and crosses (MP 146) the Overland Trail (48CR932). The Oregon-Emigrant Trail (no site number) near MP 236 is paralleled and crossed by the trunkline for about 45 miles as it heads into Casper. The Oregon-Emigrant Trail in this area is also called the Mormon Pioneer National Historic Trail. The Oregon-Emigrant Trail in this area has been previously disturbed by existing utility and transportation corridors and is a modern road for most of its length in the study area.

Three areas (no site numbers) associated with the Oregon Trail in Wyoming may be eligible for the NRHP and are in the study area: the Emigrant Gap (MP 272), Rock Avenue (MP 262), and the Willow Springs-Ryan Hill area (MP 252-254). These historic areas have been previously disturbed by existing transportation and utility corridors, which the proposed trunkline follows.

Southern Rangely Lateral Alternative. A total of 13 cultural resources are known to be located in the one-mile-wide study area: 11 are prehistoric and two are historic. One historic resource may be eligible for the NRHP: the Rangely-Dragon Trail (52/05/0007), a county road, is crossed at MP 12.

Northern Rangely Lateral Alternative. A total of 19 cultural resources are known to be located in the one-mile-wide

study area: 15 are prehistoric and four are historic. One historic resource may be eligible for the NRHP: the generalized route of Fremont's Third Expedition (52/04/0002) in 1845 is paralleled and crossed between MP 10 and 30.

White River Alternative. A total of five cultural resources are known to be located in the one-mile-wide study area: three are prehistoric and two are historic. The historic resource may be eligible for the NRHP: it is the generalized route of Fremont's Third Expedition (52/04/0002) in 1845 and is crossed at MP 10.

Yampa River Alternative. A total of six cultural resources are known to be located in the one-mile-wide study area: four are prehistoric and two are historic. One historic resource may be eligible for the NRHP: it is the Thornburg Wagon Road (41/03/0002), presently an unimproved dirt road, which is paralleled and crossed between MP 36 and 38.

Visual Resources

Visual resources is a term used to describe both the visual character and the visual quality of the landscapes traversed by the proposed trunkline and alternative routes. Visual character refers to the objective description of the physical features of the landscape setting, such as topography, vegetation, water, and soils, and their overall contribution to the line, form, texture, and color of the landscape composition. Visual quality refers to the distinctive way that these resources combine to result in a unique or outstanding scene, and to the relative value placed on the landscape by the viewing public.

For purposes of this study, the procedure adopted by BLM, embodying these same concepts, is used as the primary reference for analysis. The BLM procedure, entitled the Visual Resource Management (VRM) system (described in BLM manual 8400 and available in BLM district offices) provides a standardized method for inventorying and classifying the visual resources within each district. The VRM classification is based on an evaluation of the existing landscape in terms of its scenic quality (outstanding features), visual sensitivity, and viewing distances. There are five possible VRM classes--I through V (see glossary for definitions of each class)--where I represents the most highly valued, pristine landscape, and II through V represent, in descending order, natural landscapes that have either been modified or lack distinguishable features to the extent of needing rehabilitation. The VRM classes are used as a guide by the BLM in determining the degree of compatibility between the landscape and the proposed development.

Proposed Trunkline. The proposed trunkline traverses a variety of landscapes with different types of visual resources. It parallels existing pipeline ROW and roadways along major portions of the route and does not cross or come near any VRM Class I areas (pristine landscapes) but does traverse some Class II and Class III areas of special note. Table 3-9 identifies selected visual resources within one to two miles of the proposed trunkline where the proposed action could result in noticeable visual contrasts (see Chapter Four). Natural waterways (rivers and streams) are identified in the table because they have particular value as scenic resources and offer diversity of vegetation and habitat, as well as having unique kinetic motion and reflective qualities. These visual characteristics are particularly valuable in regions where

Table 3-9. VISUAL RESOURCES* -- PROPOSED TRUNKLINE

Milepost	County	VRM Class	Dominant Visual Features
16-32	Rio Blanco, CO	II	From the crossing of Piceance Creek and the secondary roadway, to the Dry Fork of Piceance Creek (MP 32), the landscape is characterized by dramatic changes in topography and abundant vegetation. The dominant form and line resulting from steep slopes, and deep drainage patterns; combined with the preponderance of pinyon-juniper, make up the high quality scenic features. The proposed ROW parallels an unimproved county road along Collins Gulch and follows an existing pipeline ROW. The Dry Fork/Piceance Creek area is a popular sport fishing and hunting resource, adding to the sensitivity of this scenic area.
37	Rio Blanco, CO	II	This milepost marks the White River crossing at State Highway 64. (The north fork of this same river has been identified for potential study as a scenic and recreational river by HCRS). The mountainous background provides an enclosed scene of the free flowing river. Dominant features include the meandering line of the river in the foreground and the strong form of the ridge line in the background. As noted in the recreation background report, the White River Resource Area is a major recreation resource for fishing, boating, and water related sports. Within 1/4 mile, State 64, parallels the river, providing excellent access to this area, and to the scenic vistas on both sides of the river.

Table 3-9. (concluded)

Milepost	County	VRM Class	Dominant Visual Features
70-85	Moffat, CO	II	The Yampa River crossing is identified because it is within the segment inventoried by HCRS for potential study as a protected scenic or recreation resource (the segment runs between the Little Snake and Williams Fork tributaries). The landscape along this portion of the river does not exhibit particularly high scenic qualities (both banks have been developed for agriculture), however, the section of pipeline ROW which continues along Spring Creek does exhibit a variety of color, texture and line of high scenic quality. Interstate 40 (1/4 mi) and the close proximity to the town of Maybell (1 mile) make the Yampa crossing extremely visible to the public.
195	Carbon, WY	IV	This segment of U.S. 237 has been identified for study under the National Trails Act (P.B. 95-625) for designation as the Continental Divide National Scenic Trail. Because the trail itself is a major roadway, and the proposed pipeline ROW follows an existing pipeline, the visual quality of the foreground landscape is rated VRM IV.
212-215	Carbon, WY	III	Sand Creek Canyon, between Ferris Mountain and Bear Mountain. This canyon exhibits strong form and texture from topographic features and vegetation patterns. Public access is limited to undeveloped roads and trails, somewhat reducing the degree of sensitivity of the landscape. The area is within 15 miles of two major recreation resources (Pathfinder National Wildlife Refuge and Seminoe Reservoir).

*This table was developed by Woodward-Clyde Consultants' visual resource specialist in consultation with state and district BLM resource specialists and HCRS (Heritage Conservation and Recreation Service -- Mid-Continent Region).

semiarid landscapes dominate. Other landscapes of note include steep slopes and topography where visibility is enhanced and revegetation may be difficult.

Southern Rangely Lateral Alternative. The landscape between MP 0 and MP 35 is characterized by numerous drainages and creeks and rolling to steep terrain. The ROW crosses Piceance Creek (MP 6-7), Yellow Creek (MP 13), and Spring Creek (MP 28.5); all are characterized by fairly steep banks on either side (e.g., 23 percent slope on the western side of Piceance Creek). Dominant features, in addition to the outstanding variety in landscape form, include rich colors and texture of natural vegetation (pinyon-juniper primarily). A major portion of this landscape is unmarred by human modifications (roads and existing pipelines), and public access is limited.

Northern Rangely Lateral Alternative. The landscape between MP 0-27 along the White River is classed VRM II, a high quality visual resource, because of its scenic value to both motorists (using State Highway 64) and recreationists who use the White River area.

White River Alternative. Visual characteristics of this alternative river crossing are similar to those of the proposed trunkline crossing with steep grades on either side providing an enclosed view of the riverscape. The initial eight miles of this alternative traverse the ridge line along an existing pipeline ROW, which is above the viewing area from State Highway 64.

Yampa River Alternative. This ROW alternative crosses the river within the segment inventoried by the HCRS for potential study as a protected scenic or recreation river. The landscape at the point of crossing is not particularly scenic and has been developed as agricultural land. The landscape north of the river crossing (MP 25-32) parallels an existing road and pipeline.

Social and Economic Conditions

Potential social and economic impacts of the proposed trunkline and alternative routes were assessed for the following counties and communities:

- Garfield County, CO
  - Parachute
  - Rifle
- Rio Blanco County, CO
  - Rangely
  - Meeker
- Moffat County, CO
  - Craig
  - Maybell
- Carbon County, WY
  - Baggs
  - Rawlins
- Sweetwater County, WY
- Natrona County, WY
  - Casper

Definition of this study region and the social and economic issues relevant to this assessment is discussed in the Framework for Analysis (see Appendix B). Documentation of the assessment of potential social and economic impacts is in the Background Report.

Temporary demands for services and facilities associated with construction of the proposed trunkline and alternative routes would be short term and relatively minor, but their impact would become potentially significant in the

context of the very rapid growth and development predicted to occur in the study region over the next five years. The cumulative effects of simultaneous major resource development projects would aggravate current shortages of local labor and community accommodation, so that construction workers could have difficulty finding temporary lodging near the proposed route.

Of the nine communities considered in this assessment, seven were identified as communities that could experience potentially significant cumulative impacts as a result of temporary construction workforce demands for accommodation in 1984. These seven communities are discussed below. Rawlins and Casper, Wyoming would be able to supply needed services during construction.

Parachute. The population of Parachute has been projected to rise from 448 to 1865 by 1984 (CWACOG 1980a). At present there are no motels, hotels, vacant trailer court spaces, or rental units of any kind available in the community (Cutter 1981). Union Oil is constructing apartments and trailer courts for workers, and some private developers are planning to build approximately 100 housing units in Parachute. In addition, the community is investigating land annexation and land acquisition for hotel/motel construction (Cutter 1981).

Parachute's housing shortage should be eased considerably by the construction of the new town of Battlement Mesa a few miles away. Over the next 10 to 15 years, more than 7000 housing units will be built. The new town is being built mainly to accommodate Colony employees but will offer housing to the general public as well. By 1985, Battlement Mesa, Inc. plans to construct 2500 apartments, 1700 single family homes, 700-800 townhouses, and 1000 mobile homes. By the end of 1985, the mobile homes will be phased out and replaced by an additional 300 single-family units (Kane 1981).

Parachute will share some services and facilities with the new town, including sewer and water, fire protection, and some schools and recreation facilities (Glenwood Post January 9, 1981). It is likely that hotels, motels, and other forms of temporary housing will be built to serve the needs of the Battlement Mesa population, and that Parachute will be able to take advantage of some of these facilities as well.

Rifle. In the next few years Rifle will be one of the fastest growing communities in the oil shale area. CWACOG (1980a) predicts an increase in Rifle's population from 3933 in 1980 to 18,113 in 1984. The community's sewer system is now being upgraded to accommodate up to 12,000 people.

Rifle currently has a total of 136 units in four hotels/motels, all of which are fully occupied. A high proportion of the occupants are energy workers. Rifle's four mobile home parks, with a total of 414 spaces, are also filled to capacity (BLM 1980a).

Some 3000 housing units are currently under construction or recently approved in Rifle. These include single family, multi-family, and condominium units. A trailer park which will contain approximately 160 lots has been approved, and two additional motels have been unofficially proposed (Spillman, Bean 1981).

Rangely. Rangely's population is predicted to expand from 2026 in 1980 to 5919 in 1984 (CWACOG 1980a). A study

recently completed by Community Services Collaborative of Boulder, Colorado estimates that Rangely will be short 700 rental units and 1100 single-family units within five years (Rangely Times January 22, 1981). At present, four housing subdivisions, with a total of 188 single-family and 168 multifamily units, are approved or under construction. A 40-unit apartment complex, which would be Rangely's largest, is planned for construction in 1981.

Rangely currently has four hotels-motels with a total of 88 units. These are reported to be full from spring through December, and almost full from December through spring. Approximately 95 percent of the units are occupied by energy workers (BLM 1980b). In 1980, 46 motel units were constructed, but no more units have been officially proposed for 1981 (Beard 1981). Rangely also has five mobile home parks with a total of 190 spaces and a 28-space camper park. Two facilities, which will accommodate a total of 341 recreational vehicles, will be built in the near future (BLM 1980b).

Meeker. Meeker's population has been forecast to increase by 247 percent by 1984 (CWACOG 1980a). Preliminary 1980 census figures indicate that while Meeker's population increased by 251 between 1970 and 1980, housing units in the town increased by 320 during the same period (Meeker Herald December 4, 1980). Meeker's planners feel that recent growth has been accommodated well, and that the town is reasonably "caught up" now in terms of immediate need for basic municipal services and permanent housing lots. The town's sewer system capacity is now being doubled and will soon be capable of serving a population of 8000. Permanent housing supply is still tight, however. This is due partly to high interest rates, rather than a shortage of serviced land. There are lots available for construction in Meeker now, and several new subdivisions are planned, including a 1400-acre planned unit development (PUD) which is being considered to meet Meeker's future housing needs. The community is working to annex the land needed for this PUD, and funds are being sought under the Department of Housing and Urban Development's 1980 New Community Act. The proposed development, Meeker Terrace, would be phased and could accommodate an eventual population of 16,000 (Rehburg 1981).

Based on Department of Natural Resources estimates (CDNR 1980), workers on eight proposed resource development projects and their families would need an estimated 2240 additional housing units in Meeker in the next five years.

The temporary housing market in Meeker is also very tight now. Meeker currently has six hotels and motels with a total of 95 rooms. These facilities are almost always filled to capacity. It is estimated that approximately two-thirds of the occupants are energy workers (BLM 1980b). There are five mobile home parks in Meeker with a total of 80 spaces. These are currently full and are reported to have a six to eight month waiting list (Smith 1981). The community accomodates up to 20 recreational vehicles. There are also about a dozen tourist resorts within 30 miles of Meeker. These provide temporary accommodation mainly to hunters. One of Meeker's hotels is presently planning an expansion, and a new 48-room Best Western hotel is in early planning stages (BLM 1980b). A 400-space mobile home park has been approved to house workers from Rio Blanco Oil Shale Co.'s planned expansion at Tract C-a.

It is impossible to predict the exact type and extent of boom town effects Meeker will be experiencing in the mid-1980s. The local high level of awareness and preparedness, plus the availability of a variety of assistance programs, will help the community to cope with rapid change.

Craig. Craig's population has been projected to grow from 9735 in 1980 to 11,298 in 1984 (CWACOG, 1980a). This is a significantly slower rate of growth than the community experienced over the past five years, when major resource developments nearby caused the population to boom.

Craig's hotels and motels are not as crowded as they were at the height of the town's recent boom period, but occupancy rates are still very high. During hunting season, the summer fair, horse races, and when construction crews are located in town, the hotels are filled to capacity. Currently, Craig has approximately 447 motel/hotel rooms. An additional 230 rooms will be built in the near future, including 175 rooms in the new Holiday Inn now under construction. There are approximately 75 temporary trailer hookup facilities in the community. The availability of temporary housing in 1984 is difficult to predict, particularly because of the erratic patterns of use by energy workers who live in Craig on a part time or temporary basis (Morelle 1981).

Maybell. The community of Maybell has one motel, with a total of ten units. The motel closes for the winter but accommodates tourists, energy workers, and hunters through summer and fall. There is a park in the community where camping is permitted in summer, and where a limited number of electrical hookups are available (Steele 1981). Maybell is a very small unincorporated community that is not likely to expand significantly by 1984.

Baggs. Population in Baggs is projected to more than double, from a current level of 430 to 964, by 1984 (CWACOG 1980a). The community recently improved its water system to accommodate up to 1500 people. Permanent housing stock in Baggs consists of 52 single-family units, eight multifamily units, and 72 trailers or mobile homes. There are three or four motels with approximately 50 units in total. There is strong demand for more housing in Baggs, including rental units. Proposed new housing developments in Baggs will include more than 125 units, including space for at least 39 mobile homes (Hunt, Buchanan 1981). Using an estimated household size of 2.75 would still fall short of 1984 needs by approximately 70 units.

CHAPTER FOUR
ENVIRONMENTAL CONSEQUENCES

ASSESSMENT ASSUMPTIONS

The description of the Proposed Action and Alternatives (Chapter Two) outlines special construction and resource protection practices proposed by the applicant to help minimize adverse environmental impacts. Impact analyses were based on the assumption that these considerations would be implemented, since these methods and mitigative measures would be stipulated by the BLM in either the Plan(s) of Operations or the ROW grant.

Construction, operation and maintenance of the following project components (detailed in Chapter Two) were considered in impact analysis: trunkline; Rangely lateral; pump stations; storage tank(s); electric service; telephone line; microwave tower(s); above- and below-ground gate valves and check valves; cathodic protection systems; and ROW markers.

Impact analyses were conducted for all resources and impact topics listed in Table 3-1. Criteria for indicating potential significance of impacts were developed for each of the resources and are presented in Appendix B. The following discussions focus on those effects having potentially significant levels of impact from a local perspective. Other impacts were identified and documented in the various Background Reports and those nonsignificant impacts will also be subject to mitigation through BLM stipulations, if the ROW grant is issued. Only those potentially significant impacts are emphasized in the following presentations of findings to assist the public and relevant agency decision makers in focusing on the more important issues.

LAND USE CONTROLS AND CONSTRAINTS

Of the proposed trunkline's 279 mile route, 126 miles would cross federal lands under the jurisdiction of the BLM. Management Framework Plans have been completed for all of the affected BLM Planning Units. This proposal does not conflict with any of these approved plans. Furthermore, no designated Areas of Critical Environmental Concern (ACECs) are affected by the proposed action. There are no significant conflicts with Wild and Scenic Rivers inventoried by the former Heritage Conservation and Recreation Service (refer to Visual Resources section).

Use of most of the affected land is also influenced by County Comprehensive Plans. Even in areas where pipeline activity is not specified as a permitted land use, however, the proposed trunkline can be accommodated through application to county authorities for special use permits, conditional use permits, or temporary use permits. In conclusion, the proposed action or alternatives do not conflict with existing land use planning and management decisions, regulations, or programs.

IMPACT ASSESSMENT FINDINGS FOR PROPOSED ACTION AND ALTERNATIVES

The following discussions of findings present significant impacts, impacts of unknown levels, and negative declarations where required by specific guidance. Findings are presented for the proposed trunkline, two alternative Rangely laterals, and the three alternatives (White River Alternative, Yampa River Alternative,

and No Action Alternative), where applicable.

Paleontology

Areas where paleontological resources of potential significance might be found along the proposed route and alternatives are listed in Tables 3-2 and 3-3. No fossiliferous or potentially fossiliferous areas of extremely high and irreplaceable scientific value were identified. Some areas of potential value, however, could be inadvertently damaged or destroyed by construction activity. Based on the assessment of low potential for finding fossils of high scientific value, however, the extent of such potential disturbance is expected to be mininmal.

Prime and Unique Farmlands

Construction of the proposed trunkline or alternative routes could cause short-term (less than one year) crop production losses on prime farmland. Operation of project facilities associated with the proposed trunkline and alternative routes would not cause any long-term crop production losses on prime farmlands, if the following conditions were met: 1) the proposed Maybell pump station were not located east of Deception Creek (E 1/2, NE 1/4, SE 1/4; and SE 1/4, SE 1/4, section 33, T7N, R95W); and 2) the pump station associated with the Yampa River Alternative (NW 1/4, section 23, T7N, R96W) was not located between State Highway 318 and the Yampa River (refer to the Soils and Prime Agriculture Background Report).

Water Resources

Proposed Trunkline. A leak or major rupture of the proposed pipeline could result in the release of shale oil into receiving waters. Compared to naturally occuring crude oils, the shale oil would be characteristically a light to very light oil, having a relatively high percent of paraffins (waxes). It would have a high pour point (e.g., temperature at which it changes from a solid to a liquid) and a relatively low viscosity and specific gravity. It would be roughly similar to a light crude oil from Libya, Nigeria, or Egypt with regard to these properties. Because of the relatively high pour point (10 to 16 °C) of the shale oil, a spill could behave either as a surface fluid (at higher background temperatures) or as a "solid or semi solid" at lower back ground temperatures. As shown in Table 3-7, the mean annual temperature of most of streams and rivers crossed is less than 10 °C. Therefore, for a given spill, it is likely that it would behave as a "solid or semisolid" surface material. However, a spill under high temperature background conditions would result in a "fluid" spill. Spills reaching the Pathfinder Reservoir would probably form a fluid surface film.

Following a "fluid" spill, evaporation would remove a portion of the lighter components present in the oil. An estimated 25 to 50 percent of the oil, by weight, could be evaporated (Nadeau and MacKay 1978). Certain components of fluid spills could dissolve, e.g., become soluble, in the water column. These would likely include alkyl benzenes, naphalenes and phenols (Jones et al. 1976). Due to reduction by evaporation and other processes, the most stable, and hence prevalent, constituent would likely be phenols. For a spill at lower background temperatures, e.g., a "solid" spill, the evaporation and solubility would be greatly reduced due to trace concentrations of petroleum hydrocarbons, principally aromatic compounds such as phenols, reaching water

supply reservoirs, and also due to the temporary curtailment of water supply intake from rivers into which a spill occurred upstream.

Evaporation and entrainment of surface or emulsified oil by relatively high background levels of suspended solids (see Table 3-7) could increase the density of the shale oil. A small portion could sink to form bottom deposits or sludge; this would represent a small percentage of the total spill volume.

The Pathfinder Reservoir is used principally for irrigation. Other identified downstream uses could include secondary contact recreation, fishing, irrigation, and stock and wildlife watering. These uses would be temporarily affected, e.g., curtailed for 2-3 weeks, until spill cleanup was completed.

Southern Rangely Lateral Alternative. For the Southern Rangely Lateral Alternative, the White River would be crossed downstream of the Rangely water supply intake. Stream diversions downstream of a spill would likely be discontinued immediately following a large spill. However, small leaks or unidentified, leaks such as larger spills prior to detection, could affect water quality in municipal water supplies, especially in downstream reservoirs. The concentration of certain toxic organics would increase, and contribute to the cumulative organic pollutant load in water supplies.

Northern Rangely Lateral Alternative. One existing municipal water treatment plant is located immediately downstream (less than 20 to 30 miles) of this alternative river crossing. This is at the City of Rangely, Colorado, which withdraws water from the White River. The treatment plant maintains a storage of 1 1/2 days supply in summer and three days supply in winter. For the Northern Rangely Lateral Alternative, a spill in the White River could affect the water supply at Rangely until detected. Once detected, a sufficient reserve supply exists such that water intake could be curtailed while the majority of the spill moved downstream past the intake. However, if a spill resulted in an accumulation of oil on upstream banks, it could continue to affect the water supply during cleanup operations, which could take one to three weeks.

100-Year Floodplains

If above-ground facilities would be located in a 100-year flood-plain, they would be elevated above the 100-year flood level (see Chapter two discussion).

Vegetation

Proposed Trunkline. A significant impact would occur in the Spring Creek area immediately north of the Yampa River near the town of Maybell (MP 72-80). Greater than one percent of the regional riparian vegetation would be disturbed by construction activity. This impact would be considered significant because the riparian community would not be expected to recover to pre-construction conditions within five years.

Wildlife

Seasonal restrictions (Table 2-5 and 2-9) on construction in critical/crucial wildlife areas would prevent any significant impacts, i.e., harassment during critical periods, that could result from construction activities. However, habitat removal associated with construction and operation of the proposed trunkline

and alternatives would result in the following significant impacts.

Proposed Trunkline. MP 4.5-11.0 - Greater than one percent of elk critical winter range would be removed by construction and operation of the proposed trunkline. This impact would be considered significant for two reasons: this shrub-dominated habitat is critical for winter survival, and the area would not be expected to reestablish within one year. Removal of this portion of elk critical winter range would be a long-term adverse impact.

During the period required for the reestablishment of winter browse species in the proposed corridor, some elk could be lost as the result of insufficient forage. The number of elk lost is not quantifiable due to uncertainty regarding factors and assumptions such as: severity of winter weather; estimated carry capacity of the impacted area and adjacent habitat; quantity and quality of alternate habitat; future big game management policy and level of harvesting allowed. Additional disturbance factors resulting from future projects in the regional area could also influence the level of elk loss.

MP 72-80 - Greater than one percent of the riparian community bordering Spring Creek would be removed by construction and operation of the proposed trunkline. This impact would be considered significant because the loss of riparian vegetation would adversely affect more than one generation of the wildlife species, such as sage grouse, which depend on this location for food, water, and cover.

Southern Rangely Lateral Alternative. MP 30-35 - Greater than one percent of deer critical winter range would be removed by construction and operation of this alternative. This would be a significant long-term adverse impact because this shrub-dominated habitat, which is critical for winter survival, would not be expected to reestablish within one year.

During the period required for the reestablishment of winter browse species in the ROW, some mule deer could be lost as the result of insufficient forage. The number of deer lost is not quantifiable due to uncertainty regarding factors and assumptions such as: severity of winter weather; estimated carry capacity of the impacted area and adjacent habitat; quantity and quality of alternate habitat; future big game management policy and level of harvesting allowed; additional disturbance factors resulting from future projects in the region.

Threatened and Endangered Species

Presence or absence of significant impacts to threatened and endangered plant and animal species would be determined as part of the U.S. Fish and Wildlife Service Section 7 Consultation. This process has been initiated, and the results from it are expected to be reported in the Final EIS.

Cultural Resources

The Historic Preservation Act of 1966 and 36 CFR 800 require that adequate consideration be given to significant cultural resources. As discussed in Chapter Two, the BLM, in consultation with the State Historic Preservation Officers and the applicant, will use the Class I cultural resources inventory data to develop an inventory plan to locate significant cultural resources. This inventory plan will define the extent and intensity of on-the-ground inventory on federal and non-federal

land that will be necessary to comply with cultural resources legislation. The plan will delineate the areas along the selected route that will require inventory after engineering-survey is complete. It is anticipated that information from the inventory plan will be available for inclusion in the FEIS and will become stipulations in either the right-of-way grant, or the Plan(s) of Operation.

Other topics covered in the stipulations will be agreements and plans for the evaluation of resources in terms of their eligibility to the NRHP; avoidance of significant resources by realignment; and implementation of an approved mitigation plan for significant resources that can not be prudently and feasibly avoided.

In the areas requiring intensive inventory, significant known surface and subsurface resources would be avoided, recorded, or have data recovered prior to construction if prudent and feasible. In the areas not inventoried, construction activities may alter, damage, or destroy previously unknown sites and result in disturbance to or loss of horizontal and vertical subsurface cultural information. Mixing and loss of artifacts and stratigraphic data could also occur. Alteration, damage, or destruction of these resources could result specifically in the following:

- Loss of scientific and cultural information and artifact materials
- Loss of physical expression of the resource
- Loss of the resource for future research
- Loss of unique resources
- Loss of resources that may have important cultural affiliations

Indirect beneficial impacts on cultural resources that could result from project construction are as follows:

- Cultural resources previously unknown could be located
- Information previously unavailable could be recovered if significant sites are located

Visual Resources

The analysis of consequences was based on the BLM Visual Resource Management System for inventorying and evaluating visual resources, and for determining the degree of landscape contrast resulting from project development (see BLM manual 8423 for a description of this procedure). Adverse visual consequences occur where the proposed action or alternatives would significantly contrast with existing landscape features (line, form, texture and color).

Visual management classes, delineating visual quality, sensitivity and viewing distance for all landscapes traversed by the proposed action, were used as the basis for the contrast assessment. The use of revegetation, construction and restoration methods (described in Chapter Two) were considered in the analysis, as well as access to the view, angle of observation, and duration of the view. The contrast evaluation was primarily concerned with residual effects of construction activities, such as surface scars, and structures (pump stations).

A major portion of the ROW parallels existing pipelines and roadways where visual contrasts are already evident, thus reducing the quality of the landscape. Contrasts resulting from the proposed action would be less significant in these settings than in unmarred landscapes; however, in particularly sensitive landscapes (such as canyons, valleys, and along exposed ridges) the cumulative effects are considered significant.

Pipeline construction removes vegetation, disturbs existing topographic features, and in some instances creates new drainage patterns. The effect of these activities most frequently results in the introduction of an unnatural line (the ROW) across the landscape, which contrasts noticeably with the existing landscape features. Most contrasts relating to vegetation removal are tempo rary and can be mitigated through standard reclamation practices within one to two growing seasons. These are considered insignificant unless they occur in pristine (VRM Class I) landscapes (of which there are none in this project environment).

Other landscape features would not recover so easily or quickly, and the visual contrast would remain for a longer period of time (over 2 years) and result in significant visual consequences. Longer-term contrasts frequently occur in rocky and steep-sloping terrain that are difficult to restore and in unstable soils, such as sand dunes.

Trunkline. Significant visual consequences resulting from the proposed trunkline would be as follows:

MP 16-32 - Piceance Creek and surrounding area -- Though a ROW exists (unimproved road and pipeline) along a major portion of the proposed trunkline, the cumulative consequences of additional disturbance to mature vegetation (248 acres of pinyon-juniper) and steep slopes will be significant in this scenic (VRM II) and recreation area (fishing and hunting). Cleared ROW leaves exposed soils which contrast with the existing color and texture of vegetated terrain. Additionally, pipelines are exposed when they cross deep gullies, leaving unnatural lines evident.

MP 37 - White River Crossing -- Existing pipeline ROW is already very evident on the distant slopes in the background of the river, creating an unnatural line in this high-quality landscape (VRM II). Additional construction activities would increase the extent of human modifications noticeable in the landscape setting. Sensitivity is heightened by the viewing distance from State Highway 64 (less than 1/4 mile) and the extensive use of this road for access to recreation resources within the river basin.

MP 70-85 - Yampa River Crossing and Spring Creek area -- Though the landscape at the point of river crossing does not exhibit unusual or unique scenic qualities, the river has been inventoried by HCRS for study and requires special note. The proposed pipeline crossing is in an agricultural area where recovery potential is excellent for visual disturbances. The Spring Creek section of ROW would result in significant visual consequences if riparian vegetation is cleared along this high-quality natural landscape. The proximity to the town of Maybell

increases the sensitivity of the visual consequences of this resource.

MP 106 - Little Snake River -- This VRM Class II area is noted for its unusual landform (badlands). Visual contrasts in line, color, and form are likely to result from pipeline construction in this landscape, which would be within the seen-area of a nearby county road.

MP 195 - Continental Divide National Scenic Trail -- Since the pipeline construction would result in only short-term disruption to the visual characteristics of the foreground landscape, and the proposed ROW follows an existing pipeline, the visual consequences would be insignificant at this crossing.

MP 212-215 - Sand Creek Canyon -- Though the proposed trunkline parallels an existing pipeline ROW, the added disturbance to ground cover in this fragile dune area would result in highly visible contrasts to the uniform texture and color patterns of natural vegetation. The difficulty of reclamation and the erosion potential in the dune area would result in unnatural lines and evidence of human modification to the landscape, which fail to meet the management objective of a VRM Class III area. Sensitivity of this impact area is somewhat reduced because of limited acce ss to the area.

Southern Rangely Lateral Alternative. Although access to the landscapes along this alternative pipeline ROW is limited to unimproved roads and trails, significant visual consequences would result from having to clear vegetation, disturb soils, and cut along steep slopes in this predominantly natural area. The unnatural line of the pipeline will be highly visible from the air. The potential for erosion where vegetation is cleared from steep slopes is high, resulting in further visual consequences.

Northern Rangely Lateral Alternative. As this alternative pipeline route comes down the ridge at a perpendicular angle on the south side of the White River and ascends the slope to the north of the river, the unnatural line resulting from exposed soils and cleared vegetation would contrast with the existing color and texture of the landscape, creating a significant visual consequence in the VRM II area. Because steep slopes are difficult to revegetate successfully, the potential for erosion and further visual consequences is high. This alternative pipeline ROW is within the seen area from State Highway 64, a primary corridor along the White River resource area, adding to the sensitivity of the contrast.

White River Alternative. The pipeline ROW would be highly visible from State Highway 64 as it ascends the northern slope enclosing the White River landscape. The unnatural line resulting from cleared vegetation and exposed soils would detract from the existing visual feature of the site, such as the meandering line of the river and the dominant form of the bordering mountains. Because the steep slopes would be difficult to revegetate, this evidence of human modification would be visible for well over 2 years.

Yampa River Alternative. The significance of this crossing is directly related to the presence of this segment of the Yampa River on the inventory list compiled by the former Heritage Conservation and Recreation Service (HCRS) for

potential study as a scenic or recreational river. Visual consequences at this crossing would be insignificant because the landscape is primarily composed of agricultural lands, where reclamation is enhanced. The remainder of the ROW parallels existing corridor development, negating visual consequences of significance.

Wilderness Resources

No project-related components would be located within a Wilderness Study Area or in other areas under consideration for inclusion in a wilderness program.

Social and Economic Conditions

Construction. Four crews would work simultaneously on four construction spreads, varying in length from 35 to 139 miles. Construction time for each spread would range from 2.5 to 4.0 months. Two spreads would employ 100 workers; the other two would employ 132 workers. Construction phase workers would be approximately 55 percent skilled and 45 percent unskilled.

Construction crews would seek temporary accommodation and services in communities within reasonable commuting distance of construction sites. Because of the rapid rate of construction, they would not remain in one area more than three to four weeks. For the purposes of this analysis, it was assumed that construction workers would be non-local, and that they would not bring dependents to the area because of the short construction period.

Even though the actual need for temporary housing and community services resulting from the proposed action is not large, the incremental demand would constitute a significant cumulative impact in seven of the nine communities assessed. This is because the current housing situation in Parachute, Rifle, Rangely, Meeker, Craig, Maybell, and Baggs is extremely tight, and demand over the next five years is projected to increase due to major planned resource developments. It should be noted that while housing is tight in Parachute, the adjacent new town of Battlement Mesa will offer a good supply of housing over the next decade.

Operation. Although the operation workforce is very small, it would contribute to the overall cumulative impacts of planned resource development projects in the Meeker area. The number of housing units that would be required to accommodate new residents who come to Meeker as a direct or indirect result of the proposed action is estimated at 40. This figure is obtained by multiplying the number of operations jobs (25) by the employment multiplier (1.6). This figure represents the "worst case", since it is probable that some of these jobs may be held by persons who already occupy homes in Meeker.

The current and projected availability of housing in Meeker is described in Chapter Three. The supply of single-family and rental housing in Meeker is very tight now. If mortgage interest rates drop, this situation could improve in the short term. By 1985-86, however, projected demand for housing in Meeker is extremely high because of simultaneous energy resource developments in the area. If approved, Meeker's new PUD, could accommodate up to 16,000 people and satisfy the town's anticipated housing needs. According to the Rio Blanco County planner, plans for the PUD are progressing. The water system has been planned, and it is expected that some mobile home lots will be prepared this year (Rehburg 1981).

The incremental permanent population associated with the proposed action

would be far below common standards for unit increases in community services, such as schools, health care facilities, police and fire vehicles and staff. Nonetheless, the total cumulative demands of anticipated population growth resulting from other possible projects would mean there could be little excess capacity in most community services in 1985-86. Meeker residents are well aware of the impending growth and potential impacts. Community residents, planners, and officials seem determined to manage that growth sensibly, with assistance from other levels of government, and with cooperation from the developers responsible for community expansion. Meeker and Rio Blanco County officials are seeking assistance funds and developing new programs that, if successful, would alleviate potential problems.

No Action Alternative. Potentially for all alternatives assessed are identical, with the exception of the No Action Alternative. Selection of the No Action Alternative would mean that upgraded shale oil from northwestern Colorado would have to be transported to refineries and markets by an alternate means. If this oil were transported by truck, the transportation impacts associated with the No Action Alternative would also be significant, and they would be much more serious than those associated with the proposed action, in terms of magnitude, intensity, and duration.

In the Final Environmental Impact Statement for the proposed Colony oil shale development, the BLM assessed the impacts associated with trucking as an alternative to the proposed pipeline system. Such a system would require at least 220 trucks per day with capacity of 9000 gallons each, just for the Colony development (BLM 1977). Impacts identified for this alternative included increased highway degradation, traffic congestion, traffic accidents, air emissions, and oil spills. The EIS points out that "present and planned highways are not designed for this high rate of use by heavy trucks" and that trucking would require higher numbers of project employees, which "would increase the social and environmental impacts analyzed...by approximately ten percent" (BLM 1977).

UNAVOIDABLE ADVERSE IMPACTS

Paleontology

Subsurface vertebrate fossils may be destroyed or damaged during construction, maintenace, or repair activities.

Vegetation, Wildlife, and Aquatic Resources

No biotic resources within the proposed ROW would be permanently lost. However, wildlife habitat and vegetative resources at pump stations (a total of 19 acres) would be disturbed on a long-term basis. Irreversible and irretrievable biotic resources lost at pump station sites include:

- Ten acres of elk critical winter range and deer fawning area at MP 0
- Three acres of mule deer critical winter range at MP 71
- Three acres of mule deer critical winter range at MP 116

Cultural Resources

In areas not inventoried, sites may be destroyed or damaged during construction, maintenance, or repair activities.

Visual Resources

Completion of the project would cause unavoidable visual resource impacts along the route. The outlined restoration program (Chapter Two) would

reduce visual impacts in three to five years to an acceptable level.

Social and Economic Conditions

The proposed action would contribute to the cumulative impacts of proposed developments on communities in the study region.

RELATIONSHIP BETWEEN THE SHORT-TERM USE OF THE AFFECTED ENVIRONMENT AND THE LONG-TERM PRODUCTIVITY

The following discussions address the trade-off between local short-term use of the environment and long-term productivity to the nation for the proposed action, if approved.

Paleontology

Some long-term beneficial impacts may result from unearthing resources for study by paleontologists.

Cultural Resources

Long-term benefits would result from information gathered during the cultural resource inventory and any subsequent excavation or preservation of located sites. However, short-term use could eliminate long-term benefits of preservation and any opportunity for future studies.

Social and Economic Conditions

The short-term economic impacts to the area would largely result from the expenditures of the construction crews along the route. As each crew would employ 100 or 132 members and their length of stay in each community would be less than four months, the total impact on local retail sales and revenues would not be significant.

The long-term impacts and productivity of this project to the economy would be felt within the petroleum producing industry, but when compared to total volume and total revenues to these industries, the impacts would be minor. Similarly, county revenues would increase as a result of project operation, but increases would be small, ranging from 0.3 to 6.9 percent in the six affected counties.

Energy Use

Pipeline construction and operation would require .22 percent of the potential energy transported.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Paleontology

Some important fossils may be permanently damaged or destroyed during construction, maintenance, or repair.

Cultural Resources

Some sites may be permanently damaged or destroyed during construction, maintenance, or repair.

RELATIONSHIP OF THE PROPOSED ACTION TO NEPA GOALS

Section 101(b) of the National Environmental Policy Act of 1969 lists a set of responsibilities that agencies must consider in managing "plans, functions, programs, and resources." The list and its relationship to this proposal are reviewed below.

GOAL: Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.

RELATION-SHIP: The proposed mitigation measures and monitoring program would minimize effects over the life of the project.

GOAL: Assure for all Americans safe, healthful, productive, and esthetically and

culturally pleasing surroundings.

RELATION: -SHIP A risk analysis was prepared for the impact analysis. Access to and utility of oil shale resources would be increased. Esthetics and cultural resources were considerations in design and placement of the proposed pipeline from the scoping period. There would be some unavoidable visual intrusion.

GOAL: Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.

RELATION: -SHIP The proposed action would be engineered to minimize risk to health or safety. Mitigation would minimize undesirable consequences. Some unavoidable adverse impacts would occur. Transportation of upgraded shale oil would be a beneficial use.

GOAL: Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment that supports diversity and variety of individual choice.

RELATION: -SHIP Important historical, natural, and cultural aspects were given consideration in the design and placement of the pipeline. The availability of the pipeline would have a beneficial impact on the shortage of low-sulfur crude oil in the midwestern United States. It would also lessen the nation's dependence on foreign crude oil.

GOAL: Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.

RELATION: -SHIP The proposal would be a step towards a more balanced use of all fossil fuel resources, lessening the dependence on imported single-source fuels.

GOAL: Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

RELATION: -SHIP The use of upgraded shale oil would increase the efficient use of heavier grades of crude oil in existing refineries. More desirable products can be obtained from existing petroleum stocks.

ENERGY BALANCE OF THE ALTERNATIVES

The analysis of energy use (see Background Report) showed that a total of 2.02×10^{13} Btus would be consumed for construction and operation of the pipeline through its 30-year useful life. Only approximately 1 percent of this total represents energy available for purposes other than product pumping. The Btu value of the product is expected to be approximately 5.8×10^{6} Btu/bbl. Assuming an average daily flow of 145,000 bbl/day, the pipeline would transport 8.4×10^{11} Btu/day or a 30-year useful life.

The ratio of energy consumed to energy transported is 2.2×10^3, or in other words, the energy used in the pipeline project would amount to less than 0.3 percent of the energy that would be transported by the pipeline. Given this extremely low number and the few miles difference between the length of the proposed versus alternative routes (six miles total difference), differences in energy use between alternatives are indiscernable.

COMPARISON OF ALTERNATIVES

Chapter Two, Alternatives, briefly describes the comparison of four route alternatives and the No Action Alternative which were analyzed at the same level of detail as the proposed action. Tables 4-1, 4-2, and 4-3 provide selected information for comparing alternatives. For the route alternatives, Comparison One compares the southern and northern Rangely laterals, Comparison Two is that of the White River Alternative (CEF, Map 3, Appendix F) with the proposed action segment for crossing the White River (CF, Map 3, Appendix F). Comparison Three is composed of the Yampa River Alternative (GHI, Map 3, Appendix F) and the proposed action crossing of the Yampa (GI, Map 3, Appendix F). Due to the close proximity of route alternatives, there are many aspects of the environment which provide no substantial basis for comparison.

PREFERRED ALTERNATIVES

Comparison of potential impacts for each set of alternatives resulted in the following findings:

Comparison One: Southern Rangely Lateral (AB) versus Northern Rangely Lateral (DEB)

Only 7 percent of the Southern Rangely Lateral would be located near existing utilities, versus 66 percent of the Northern Rangely Lateral. In addition, construction of the Southern Rangely Lateral would result in:

- Disturbance of six additional miles or 73 additional acres
- Potentially significant impact to mule deer critical winter range
- Potentially significant impact to eight additional miles of visual resources, and one additional VRM Class II creek or river crossing

Comparison Two: Proposed Trunkline White River Segment (CDF) versus White River Trunkline Alternative (CEF)

Although construction of the White River Trunkline Alternative would result in disturbance of five additional miles or 61 acres more than the Proposed Trunk line segment, other potential environmental consequences were found to be similar.

Comparison Three: Proposed Trunkline Yampa River Segment (GI) versus Yampa River Trunkline Alternative (GHI)

The Proposed Trunkline Yampa River Segment would cause potentially significant impacts to vegetation and wildlife that would be avoided by the Yampa River Trunkline Alternative.

Based on these findings, the Agencies' Preferred Alternative for Comparison Three is the Yampa River Trunkline Alternative (GHI). For Comparison Two, the Agencies' Preferred Alternative is a combination of segments from the Proposed Trunkline and the White River Trunkline Alternative, as illustrated on Map 4-1.

While this analysis indicates that the Northern Rangely Lateral would result in fewer significant environmental

Table 4-1. COMPARISON OF ALL ALTERNATIVES

Information for Comparison	Total Proposed Trunkline	Route Alternatives: Comparison One — Southern Rangely Lateral Alternative	Comparison One — Northern Rangely Lateral Alternative	Comparison Two — White River Proposed	Comparison Two — White River Alt.	Comparison Three — Yampa River Proposed	Comparison Three — Yampa River Alt.	No Action
Miles	279	41	35	11	16	37	38	0
Acres disturbed	3,382	497	424	133	194	448	461	0
Miles near existing utilities	183	3	23	3	8	15	6	0
Percent of total near existing utilities	66	7	66	27	50	41	16	0
Miles not near existing utilities	96	38	12	8	8	22	32	0
Percent of total not near existing utilities	34	93	34	73	50	59	84	0
Visual								
VRM Class II area, creek and river crossings	3	3	2	1	1	1	1	0
Miles of significant visual consequences	61	35	27	.5	.5	0	0	0
Recreation								
Managed areas crossed	1	0	0	0	0	0	0	0
Inventoried wild, scenic and recreation rivers crossed	1	0	0	0	0	1	1	0
Wilderness								
Boundaries crossed	0	0	0	0	0	0	0	0
Within two miles of ROW	1	0	0	0	0	0	0	0
Transportation								
Major roadways crossed	13	2	2	2	2	3	3	0
Intercity road use impact	L	L	L	L	L	L	L	H
Social/Economic								
Maybell: nuisance factors	mod.	N/A	N/A	N/A	N/A	mod.	low	0

N/A = Not Applicable.
L = Low intensity, short duration.
H = High intensity, long duration.

Table 4-2. BIOLOGICAL COMPARISON OF ROUTE ALTERNATIVES

Information for Comparison	Comparison One		Comparison Two		Comparison Three	
	Southern Rangely Lateral Alternative	Northern Rangely Lateral Alternative	White River Proposed	White River Alternative	Yampa Proposed[a]	Yampa Alternative[a]
Comparison of Vegetation Disturbed (Acres)						
Desert Shrub	67	65				
Pinyon-Juniper	418	231	127	188	133	24
Sagebrush/Grassland		127			197	434
Riparian	3				115	3
Agriculture	3	6	6	6	6	3
Mountain Shrub	12					
Estimated Number of Threatened and Endangered Species Likely to Occur	0	1	1	1	1	2
Number of Acres of Crucial Wildlife Habitat Disturbed (percent of total)[b]						
Mule Deer Critical Range Winter Range	200 (>1%)	121 (<1%)	30 (<1%)	157 (<1%)	264 (<1%)	173 (<1%)
Elk Critical Winter Range						12 (<1%)
Sage Grouse Strutting/ Brooding Grounds	242 (<1%)				48 (<1%)	97 (<1%)
Sage Grouse Winter Concentration Area	8.5 (<1%)					
Crucial Riparian Habitat					97 (15%)	
Golden Eagle Nests (number)	(3)	(4)		(2)	(2)	
Bald Eagle Winter Concentration Area		Entire Corridor				

[a] Including pump station.

[b] Percent of the total regional resource.

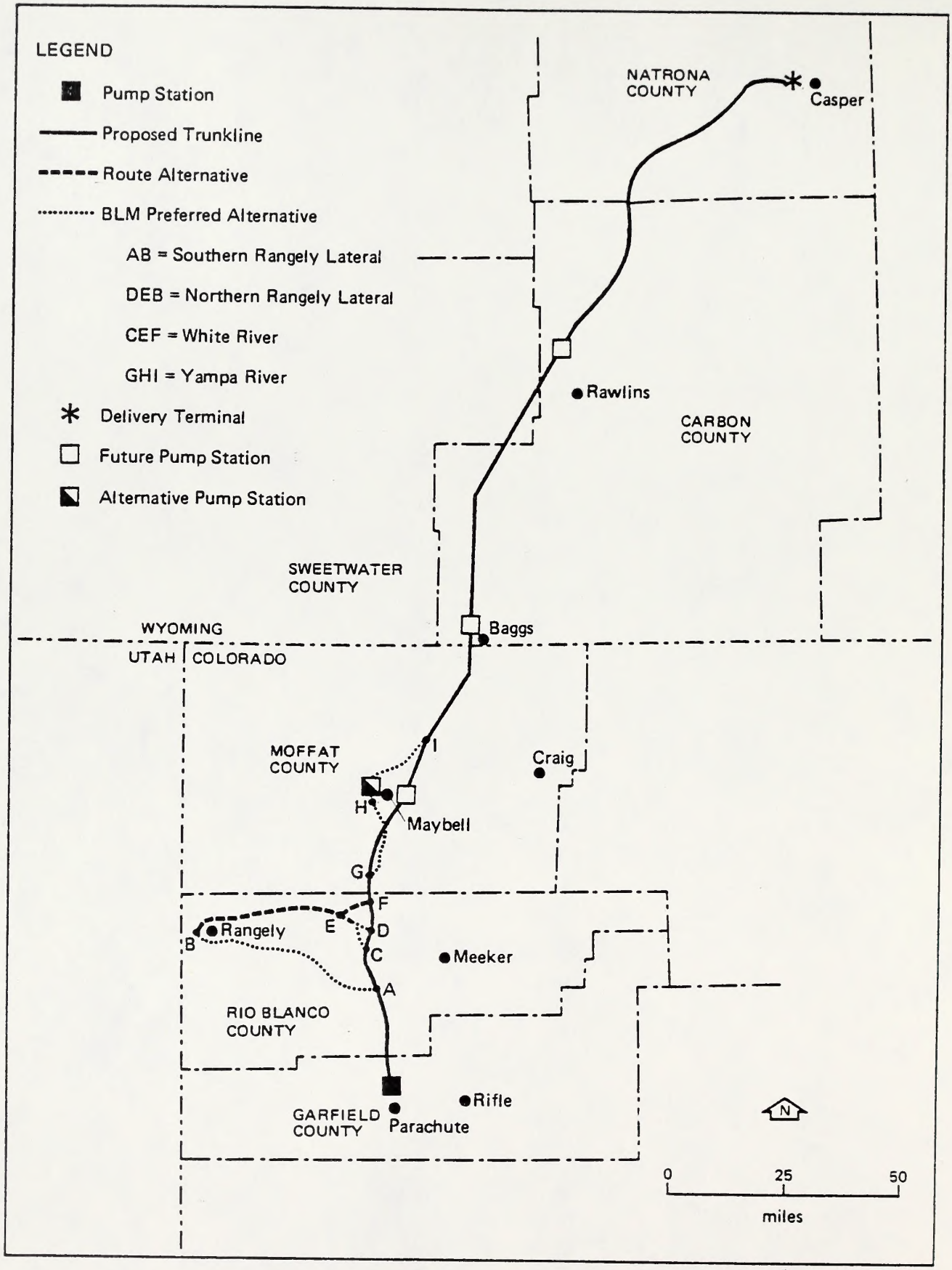
Table 4-3. RECLAMATION POTENTIAL FOR ROUTE ALTERNATIVES.

Criteria for Comparison	Comparison One		Comparison Two		Comparison Three	
	Southern Rangely Lateral Alternative	Northern Rangely Lateral Alternative	White River Proposed	White River Alternative	Yampa River Proposed	Yampa River Alternative
Soil susceptibility to water-induced erosion	mod-high[a]	mod-high[a]	mod[a]	mod-high[a]	low-mod[a]	low-mod[a]
Soil susceptibility to wind-induced erosion	low-mod[b]	low-mod[b]	low-mod[b]	low-mod[b]	mod-high[b]	mod-high[b]
Potential for mitigation and successful reclamation[c]	low[c]	low-mod[c]	mod[c]	low-mod[c]	low-mod[c]	mod[c]

[a]Based on K factor values where: <.2 = low; .2-.39 = moderate; and ≥ .4 = high.

[b]Based on WEG classes where: Classes 5-8 = low; 3-4L = moderate; and 1-2 = high.

[c]Principle items considered in determination includes relative topsoil suitability, potential for successful revegetation, and expected success of erosion control measures. Where the alternatives are essentially similar, the rating is based on these differences between critical areas.



Map 4-1. LOCATION OF BLM PREFERRED ALTERNATIVES

impacts than the Southern Rangely Lateral Alternative, the Southern Rangely Lateral Alternative was selected by the BLM as the Preferred Alternative for Comparison Three. This is because the Southern Rangely Lateral is closer to known potential sources of shale oil; therefore, it would be more accessible to future users and would require less additional future ROW disturbance for connecting pipelines.

APPENDIX A
CONSULTATION AND COORDINATION

THE SCOPING PROCESS

The Council on Environmental Quality's Final Regulations for Implementing the National Environmental Policy Act (40 CFR, Part 1501.7) require an early and open scoping process prior to initiating an Environmental Impact Statement. The major purpose of the process is to identify the significant issues associated with the proposed project in order to develop and limit the scope of the EIS.

An additional purpose of the scoping process is to inform potentially affected federal, state and local agencies and other interested persons and organizations about the proposal. Existing environmental reports and data related to the proposal are also identified, along with necessary consultation and review requirements. The ultimate objective of the scoping process is to enhance better decisions through the achievement of these purposes. By emphasizing significant issues in the EIS, the magnitude of paperwork and the length of the statement may also be reduced.

Public Scoping Meetings

Having been announced through existing mailing lists and local and regional media, 10 public scoping meetings were held (see Table A-1) over a three-week period in January and February, 1981. A detailed summary for each meeting, attendance lists, written comments solicited during the meetings, and a public announcements record is on

Table A-1. PUBLIC SCOPING MEETINGS

1981	Location
January 26	Craig, CO
January 27 [a]	Grand Junction, CO
February 2	Rawlins, WY
February 3	Casper, WY
February 4 [a]	Cheyenne, WY
February 5 [a]	Denver, CO
February 9	Meeker, CO

[a] Two meetings (one afternoon, one evening) were held at these locations. One evening meeting was held at each of the other locations.

file with the BLM Colorado State Office. A brief summary of each meeting follows.

Craig, Colorado. The discussion focused mainly on concerns of private land owners whose properties may be used for the pipeline. Issues raised included harrassment of livestock from pipeline inspection overflights (especially during lambing season), unauthorized use of new access from the ROW by hunters, and just compensation for easements and the annoyances associated with them. Other issues needing attention are the proposed Juniper and Cross Mountain reservoirs on the Yampa River. The desire for the route to follow existing pipelines where possible was also expressed.

Grand Junction, Colorado. Three areas of interest were raised at these meetings. A request that power sources for pump stations be identified was made to aid in local utilities' planning. Consideration of a variety of means for housing the construction work force in the Meeker and Rifle areas should be given. A question was raised concerning the compatibility of the proposal to carry upgraded shale oil with the needs of companies who want to ship nonupgraded shale oil. One individual expressed a concern that wildlife habitat not be disturbed during periods of critical use by deer and elk.

Rawlins, Wyoming. Strong support for efforts to follow existing pipelines was expressed in terms of a desire to reduce potential disruption to agricultural lands. A request was made to reduce the amount of surface disturbance to the minimum necessary. Questions regarding construction work force use of Baggs, Wyoming were asked. The notation was made that two county roads and two undedicated county roads would be crossed by the proposed route.

Casper, Wyoming. Consequences of a spill from a pipeline rupture should be considered in detail for the Pathfinder Reservoir and its tributary, the Sweetwater River. Tributaries of the North Platte (Fish and Horse creeks) should also be considered in mitigation developed to prevent spills in waterways.

Cheyenne, Wyoming. Two issues were raised at these meetings. The structural integrity of stream banks and the channel of the Sweetwater River should be considered, and a concern regarding the restoration of damaged snow fences was expressed.

Denver, Colorado. A number of general issues were raised for consideration in the environmental assessment. These included: geologic hazards; state highway crossings; housing of construction workers; effects of ruptures and spills; land reclamation; effects to wildlife and critical habitat for wildlife; and compatibility with mineral resources development. Questions regarding the use of this ROW by other pipelines and the compatibility of upgraded and raw shale oil in the pipeline were raised. One person requested that a detailed monitoring plan for the proposal be developed for the EIS or the Plan of Operations.

Meeker, Colorado. The discussion focused on three issues: low capacities of certain services; location of the route with respect to other shale oil tracts; and a request to reduce disturbance of irrigated lands to the greatest possible extent.

Currently, there is a shortage of both permanent and temporary housing in Meeker, and it could not be assumed that either housing or schools would have any excess capacity by 1984 or 1985. Transportation networks in the Piceance Creek basin are limited and already

heavily used. Recently, temporary accomodation of a power line construction work force created an increase in traffic accidents in and around Meeker.

The second area of discussion centered on the ultimate need for more shale oil transportation than could be provided by the capacity of this proposal. This concern was expressed in terms of pipeline capacity, products compatibility, the need for more pipelines, and the location of this proposal with respect to proposed and developing shale oil mining tracts.

Summary of Other Issues

Along with issues already summarized, a number of interests and requests for consideration were expressed during the formal and informal sessions of the public meetings and in letters responding to the scoping meetings announcements. The following listing represents a prioritization of issues, based on qualitative analysis.

- Consequences of ruptures and spills to:
  Waterways;
  - Pathfinder
  - Sweetwater River
  - Fish Creek
  - Horse Creek
  - Yampa River
  - White River and

  Cultivated hay fields

- Temporary housing (and associated facilities) for construction work force, especially in Rifle, Meeker, Craig and Rawlins.

- Permanent housing (and associated services) for 25 operations workers in Meeker.

- Consideration of mitigation of potential impacts for the following:

  1. Road and stream crossings

  2. Landslide-prone areas

  3. Critical wildlife use areas (sage grouse strutting, eagle nesting, fish spawning, and big game winter ranges)

  4. Damaged fences and disturbed vegetation

  5. Transportation networks, especially in the Piceance Creek basin

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AGENCIES CONSULTED

Baggs, Wyoming
- Town Clerk's Office

Bureau of Labor Statistics
- San Francisco, CA

Carbon County
- Office of the County Treasurer
- County Planning Office

Chambers of Commerce
- Casper, WY
- Craig, CO
- Meeker, CO
- Rawlins, WY

Colorado State
- Bureau of Economic Analysis
- Regional Economics Information System
  - Denver, CO
- Department of Health
- Division of Local Affairs
  - Division of Local Government
  - Division of Planning
  - Division of Property Taxation
- Department of Natural Resources
  - Joint Review Office
- Department of Planning
  - A-95 Clearing House
- Department of Revenue
- Division of Employment and Training
  - Labor Market Information Branch
- Public Utilities Appraiser
- State Highway Department
- State Historic Preservation Office

Colorado West Area Council of Governments

Department of Agriculture
- Soil Conservation Service
  - Meeker, CO
  - Glenwood Springs, CO
  - Craig, CO
  - Rock Springs, WY
  - Rawlins, WY
  - Casper, WY

Department of Commerce
- Bureau of the Census

Department of the Interior
- Colorado State Office
  - Grand Junction District
  - Glenwood Springs Resource Area
  - Craig District
    - Little Snake River Resource Area
    - White River Resource Area
- Wyoming State Office
  - Casper District
    - Platte River Resource Area
  - Rawlins District
    - Divide Resource Area
    - Overland Resource Area
- Water and Power Resources Service
  - Casper, WY
  - Regional Office, Denver, CO
- U.S. Geological Survey
  - Water Resources Division
    - Denver, CO
    - Cheyenne, WY
  - Area Oil Shale Office
    - Grand Junction, CO

Environmental Protection Agency
- Region IX Office, San Francisco, CA

Garfield County
- County Treasurer

Moffat County
- Clerk's Office
- Planning Office
- Planning Commission

Parachute, Colorado
- City Clerk's Office

Natrona County
- Office of the County Treasurer

Rawlins, Wyoming
- City Planning Office

Rifle, Colorado
- Office of City Government

Rio Blanco County
- County Planning Office

Sweetwater County
- County Clerk's Office

U.S. Army Corps of Engineers
- Sacramento District, CA
  - Grand Junction Field Office
- Omaha District, NB

Universities and colleges
- University of Colorado, Boulder, CO
- University of Wyoming, Laramie, WY

Wyoming State
- Board of Equalization
- Department of Administration and Fiscal Control
- Department of Economic Planning and Development
- Department of Environmental Quality
- Game and Fish Offices
  - Baggs
  - Casper
  - Cheyenne
  - Laramie
  - Sinclair
- Employment Security Commission
- Highway Department
- Industrial Siting Council
- State Historic Preservation Office
- State Planning Agency
  - A-95 Clearing House
- Watershed Management

Wyoming Retail Merchants' Association

APPENDIX B
FRAMEWORKS FOR ANALYSIS AND SIGNIFICANCE CRITERIA

The Council on Environmental Quality (CEQ) Final Regulations reflect some of the lessons learned from the past decade of experience in developing Environmental Impact Statements (EISs). Earlier environmental analyses tended to emphasize collection of data on all aspects of the affected environment. They lacked a clear focus and were often short on analysis. Almost inevitably, EIS documents were lengthy catalogues of baseline data that were of limited use to decision makers and the public. The new regulations encourage analysts to focus attention on only those aspects of the environment that might be significantly affected by the proposed action and alternatives.

The following frameworks for analysis were used to define potential impact topics warranting detailed analysis and to focus on necessary and relative levels of effort required for analyses. They were based on the draft project description, the scoping process, supplemental data collection efforts, and professional judgment.

CLIMATE

Significant impacts on climate are those that could cause a measurable change in any climatic parameters (e.g., temperature, precipitation, wind speed and direction) on a scale larger than the microscale.

AIR QUALITY

Determination of significance of air quality impacts was based on estimated pollutant emissions of volatile organic compounds associated with the two 120,000 bbl storage tanks. Because fugitive dust emissions are associated only with the construction phase of the project and are therefore temporary, such impacts would not affect regional and/or long-term air quality, and would not be considered significant.

Estimated emission rates of volatile organic compounds were compared to de minimis levels presented in the Environmental Protection Agency's (EPA's) Prevention of Significant Deterioration regulations (40 CFR 52.21, as revised on August 7, 1980). The de minimus level for volatile organic compounds is 40 tons per year. Any pollutant emissions less than these limits would have insignificant impacts on air quality.

Since volatile organic compounds were not found to be emitted in an amount greater than 40 tons per year, a qualitative assessment of the effect of such emissions on ambient air quality was not necessary. This area contains very few sources of this pollutant; thus, background levels were found to be low, as expected. Current monitoring programs in the project area that record levels of ozone were used to aid in the qualitative assessment.

GEOLOGIC HAZARDS

Impacts were considered significant if the proposed action or alternatives were found to be located both on known active faults and areas where the estimated expected horizontal acceleration figures for

the affected areas indicated a reasonably high probability of earthquake-induced ruptures.

Impacts were considered significant if the proposal was located in a landslide-prone area for which special design and engineering practices would be insufficient to reduce potential risk of rupture to a low probability.

Impacts were considered significant if the pipeline were buried in bentonite areas, as moisture would cause shrink-swell engineering problems.

PALEONTOLOGY

Impacts to paleontological resources were considered significant if there would be a high probability of damaging or destroying fossils of exceptional scientific value.

SOILS

Impacts to the soils resource from construction, operation, and maintenance of the proposed pipeline(s) and pump stations were considered significant if there is a high probability that soil erosion would not be held to acceptable levels* and disturbed areas would not be able to revegetate. Findings were based on analysis of soils and terrain traversed, and mitigation and reclamation measures contained in the project description.

*Acceptable level is defined as that amount of soil loss that would not significantly affect the long-term productivity and stability of disturbed areas.

Determination of potential problem soil areas was accomplished by analyzing published and unpublished soil maps and surveys and through discussions with applicable resource agency personnel (SCS and BLM). Construction and mitigation measures spelled out in the project description and BLM regulations were assessed as to their adequacy for protecting against significant impacts to the soils resource. Soil mitigation and reclamation measures were proposed for inclusion in the project description or the stipulations when findings from the analysis warranted.

WATER QUALITY

The analysis of potential impacts upon surface water quantity and quality included four principal areas: stream crossings, hydrostatic test water discharge, 100-year floodplains, and ruptures and spills. The framework for analysis for each of these areas is as follows.

Stream Crossings

The proposed pipeline would cross numerous washes, creeks, streams, and rivers. Based upon the U.S. Geological Survey topographic maps, these crossings can be classified as either intermittent or perennial waterways. The perennial streams and rivers can be classified as either major or minor.

Certain major river crossings were identified that would require site-specific construction design plans. These crossings, along with any crossings that could require an individual Corps of Engineers (COE) Dredge and Fill permit, were classified as major perennial rivers. All other perennial crossings were classified as minor perennial rivers.

The following crossings were identified:

- Minor perennial crossings
  - Stewart Gulch, CO
  - Piceance Creek, CO
  - Yellow River, CO
  - Yellow Creek, CO
  - Fletcher Gulch, CO
  - Duck Creek, CO
  - Spring Creek, CO (two crossings)
  - Muddy Creek, CO
  - Separation Creek, WY
  - Sweetwater River, WY
  - Casper Canal, WY
  - Fish Creek, WY
  - Horse Creek, WY
  - Poison Spider Creek, WY

- Major perennial crossings
  - White River, CO
  - Yampa River, CO
  - Little Snake River, CO

The temporary impact of stream crossing construction activities (i.e., potentially increased levels of suspended solids) was evaluated for construction operations at a generic or "typical" major perennial river crossing and a typical minor perennial river crossing. Intermittent crossings were not be evaluated because these creeks and washes would be crossed during dry periods of no flow. Estimated increases in levels of suspended solids at perennial river crossings were compared to recorded highest levels, which also occur on a temporary basis, to determine significance.

The proposed construction plan would include erosion control procedures. Soil conditions at certain streambanks may warrant mitigation measures for slopes of less than 5 percent. Because erosion control has been incorporated as a mitigation feature, no quantification was made of long-term sediment generation along the disturbed pipeline corridor or delivery into nearby watercourses.

Hydrostatic Test Water Discharge

Hydrostatic test water could be discharged at numerous locations along the route. The highest potential discharge volume was calculated from pipeline diameter and maximum distance between topographic high points. Applicable water quality data for similar hydrostatic discharge was assembled to determine the significance of instantaneous discharge.

An NPDES permit is required for hydrostatic test water discharge. This permit would be issued by the Wyoming Department of Environmental Quality and the Colorado Department of Health, for discharges within the states of Wyoming and Colorado, respectively. The regulatory requirements of these agencies were identified and the need to comply with them was incorporated into the project description as a mitigation measure.

100-Year Floodplains

Executive Order 11988 requires that federal agencies give special consideration to avoidance of facilities that can be damaged by floodwaters within a 100-year floodplain. The pump stations would be sited, or elevated, to avoid 100-year floodplains. The pipeline would cross the floodplains of numerous rivers. Based upon Department of the Interior stipulations for stream and floodplain crossings, the depth of the channel would be established by appropriate field investigations and theoretical calculations using these combinations

of water velocity and depth that yield the maximum value. At the point of maximum scour (maximum scour depth elevation) the cover over the pipe would be at least 20 percent of the computed scour, but not less than 4 feet. Therefore, no detailed analysis of potential pipe failure due to flood scour was done. Prior to construction, pump station locations would be examined for their locations with respect to the 100-year floodplain of the Yampa River (Maybell pump station) for the proposed action and alternative crossings, and for Separation Creek (Rawlins pump station). If either is located in the 100-year floodplain, the station would be relocated out of the 100-year floodplain or elevated above it (see Chapter Two).

VEGETATION

Impacts to vegetation due to removal of cover and surface disturbance were considered insignificant if: (1) no more than 1 percent of a vegetation type within the regional area would be disturbed, or (2) the disturbance would be greater than 1 percent but the impact would be beneficial or there is a high probability that perennial vegetation such as perennial grasses can be established within three years following construction, and there is a high probability for recovery of pre-existing vegetation within five years.

Threatened or endangered species are being considered on a case-by-case basis as part of the U.S. Fish and Wildlife Service Section 7 Consultation.

Delineation of vegetation that would be affected by project activities was based on mapped information and interviews with various resource agency personnel. In addition, aerial overflights were conducted along sections of the proposed route to verify existing data.

WILDLIFE

Impacts on crucial wildlife habitat* were analyzed for important wildlife species. Important wildlife species are defined as those that are recreationally or commercially important, those characterized by uncertain or declining population status, rare species, and those that are expected to be sensitive to project activities and as a result may not be capable of sustaining current populations. Species not included in the category of "important" include species such as songbirds, small mammals, and insects. These species are not generally considered recreationally or commercially important and generally are capable of rapid recovery and repopulation of disturbed areas due to large population sizes, rapid turnover rates, and mobility.

Impacts on crucial wildlife habitat resulting from vegetation and surface disturbance were considered insignificant if: (1) no more than 1 percent of the total available crucial habitat for a particular species within the regional area is expected to be disturbed, or (2) the disturbance is expected to be greater than 1 percent, but the impact is anticipated to be beneficial or short term (one year or less).

Threatened or endangered species are being considered on a case-by-case basis as part of the U.S. Fish and Wildlife Service Section 7 Consultation.

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*Crucial habitat: a portion of the habitat of important species that if destroyed or adversely modified could result in a lower probability of survival for the species in question at important periods of their life cycles. For impact analysis, the crucial habitat affected by the proposed project was compared to the total crucial habitat present in the regional area (20-mile corridor). Examples of crucial habitat areas are sage grouse strutting grounds, raptor nesting areas, and big-game winter range and migration routes.

Delineation of crucial wildlife habitat and critical-use periods that would be affected by project activities were based on mapped information, published and unpublished literature, and interviews with various resource agency personnel. These areas have been defined by milepost and included in the project description as areas that would be avoided during important-use periods (see Chapter Two).

AQUATICS

Impacts to crucial habitat and critical-use periods were determined for commercially or recreationally important fish species. No invertebrates were considered commercially or recreationally important in the affected area; in addition, these animals are capable of rapid repopulation and recolonization.

Impacts on crucial aquatic habitat were considered insignificant if: (1) no more than 1 percent of the total available crucial habitat for a particular species within the regional area is expected to be disturbed, or (2) the disturbance is expected to be greater than 1 percent, but the impact is anticipated to be beneficial or short term (one year or less or affecting recruitment of only one generation).

Determination of crucial fish habitat was accomplished through interviews with resource agency and university research personnel, in conjunction with literature searches of published and unpublished studies.

Threatened or endangered fish species are being considered on a case-by-case basis as part of the U.S. Fish and Wildlife Service Section 7 Consultation.

WILD HORSES

Impacts on wild horses were considered significant if more than 1 percent of their range is intersected by the proposed route, or if critical areas such as a spring or other water source is disturbed during construction activity.

CULTURAL RESOURCES

A synoptic BLM Class I Inventory was conducted for the proposed project. The inventory provides a cultural overview on the prehistory, ethnohistory, and history within the affected geographic region. Although the ROW grant would be for 50 feet plus the width of the pipe, site-record compilation was conducted for a one-mile-wide study area centered on the proposed and alternative routes. Regional and local research questions and goals were investigated, as available, to review information needs for the various cultural traditions and/or site types in the project area. The inventory provides the basis for discussion of known and potentially sensitive areas such as those areas of known high site density; areas with National Register resources; and areas where, because of environmental conditions, there is a high probability of containing resources. The Class I Inventory serves as the technical background document from which agency-stipulated compliance procedures, and the EIS, were developed.

Potential impacts were then assessed for significance in terms of the applicant-initiated mitigation measures and agency compliance procedures, using the following criteria of significance:

> Impacts were considered significant if there is a reasonable probability that a scientifically or culturally important resource, both surface and subsurface, could be damaged or destroyed as a result of the proposed project.

VISUAL RESOURCES, RECREATION, WILDERNESS, AND TRANSPORTATION

Visual resources, recreation, wilderness, and transportation are all interrelated from the perspective of their concern for maintaining a high quality, scenic environmental setting; therefore, the initial screening for these assessments included an inventory of all designated recreation areas, wilderness study areas, visual resources, and transportation routes that are either crossed or within 5 miles of the proposed or alternative pipeline routes and pump stations. The study area was expanded for recreation and transportation to include additional resources within travel distance of towns where the pipeline labor force may reside. Since water is a primary resource for both visual quality and recreation, waterways (rivers/streams) and bodies of water (reservoirs/lakes) were also included in the initial inventory. The following briefly describes the framework for analysis of each discipline.

Visual Resources

The standard procedure adopted by BLM for inventorying and classifying visual resources on public lands (described in BLM manual 8400) was the primary reference for this study. The classification, based on an evaluation of the existing landscape in terms of scenic quality, visual sensitivity, and viewing distance, was used to identify areas likely to be affected by the construction of the pipeline or the presence of pump stations. Areas not classified were assigned equivalent BLM classes using the same criteria.

High quality, sensitive areas were identified and described in detail prior to conducting a contrast rating evaluation with the project (described in BLM VRM Manual 8423). The contrast rating scheme was used to determine the extent to which the proposed action would alter the dominant line, form, color, or texture of existing landscape

features. Included in the assessment were the duration of the contrast (less than two years or greater than two years), the number of viewers, angle of observation, ease of revegetation, and uniqueness of the landscape feature. Only significant contrasts are identified and described in the EIS. Mitigating measures were suggested for inclusion in the proposed action, to reduce the extent of impact.

Impacts to the visual resource were considered significant if either of the following two conditions were found:

- In VRM Class II areas, changes to any of the basic elements (form, line, color or texture) would be evident for longer than one or two growing seasons, or

- In VRM Class III areas, changes would not remain subordinate to the dominant features in the landscape

Recreation

Recreation resources for this assessment include areas actually traversed by the proposed trunkline and/or alternatives and those within five miles of the proposed and/or alternative ROW where the recreation experience may be affected. Also of concern are those recreation resources that could be either directly or indirectly affected by the project work force within the area of influence (towns of Rifle, Meeker, Craig, Rawlins, Casper, Baggs, Rangely, Maybell, Parachute and the six counties of Garfield, Rio Blanco, Moffat, Carbon, Sweetwater and Natrona). For purposes of this assessment, the majority of recreation resources considered are the formally designated areas managed to both preserve and further their use for play, relaxation and amusement. Other recreation areas included are the unmanaged and dispersed recreations areas (such as sites used for fishing, hunting, hiking and off-road vehicle use) within the region of influence.

Each recreation resource was characterized according to its location in relationship to the pipeline or work-force location, its size in acres or miles, the primary type of recreation activity, and the volume (in visitor days) of use. Included in this inventory was rivers, trails, and landmarks inventoried for study by the Heritage Conservation and Recreation Service (HCRS).

Recreation consequences were described according to their duration, magnitude of effect, and potential for mitigation. Impacts were considered significant in cases where:

- The quality of the recreation resource would be permanently altered so that it no longer qualifies for recreation designation and protection by public agencies (e.g., Wild, Scenic and Recreational rivers, trails and landmarks), or

- The quality of the recreation resource would be noticeably altered for more than one visitor season, or

- Increased demand for resources resulting from the project workforce, when distributed among recreation area, would exceed the total number of facilities and resources available, or exacerbate existing and/or projected competition for resources

The proposed project would directly affect very few of the recreation resources. Temporary disruption (e.g., noise, dust, disturbance to water quality and vegetation) during the construction phase of the project due to the presence of equipment and work force could be experienced at the following sites: White, Yampa and Sweetwater River crossings; Rio Blanco Lake and Piceance Creek in Colorado; and Independence Rock, Bessemer Bend and Pathfinder National Wildlife Refuge

in Wyoming. Some overuse of campgrounds could take place during peak construction periods, and problems associated with enforcing campground limitations concerning temporary residential use of campsites could occur. None of these temporary disruptions are expected to significantly affect the quality of the recreation resource or the quality of the recreation experience.

Further, given the number of recreation resources available within travel distance of the local areas of residence, and the small number of workers, there will be no significant direct impacts resulting from the increased demand placed on resources by the project work force. It should be noted, however, that cumulative effects of increased demand on recreational resources may take place when the work force for the La Sal project is considered along with other development projects in the same geographic region.

Transportation

All transportation corridors (county, state, and interstate roads, and railroad lines) were identified according to pipeline milepost and county. Each main roadway was described according to the physical characteristics (number of lanes, paved or unpaved, and volume of traffic).

Particular attention was given to identifying scenic roadways and access roads to recreation areas where pipeline construction may temporarily impair access or the quality of the scenic experience. In the Social and Economic Conditions analysis, additional attention was given to roads where heavy equipment and supplies would be transported. Mitigation measures were outlined for all significant impacts identified.

Impacts were considerd significant if any of the following findings resulted from the analysis:

- Equipment used for construction would not comply with existing load limitations on roadways
- Intersections between new access roads or pipeline and existing roadways would present safety hazards
- Detours for construction activities would be long-term and involve heavily-traveled roadways
- Movement of the labor force to the project site would generate or add to traffic congestion (roadway capacity) by more than 30 percent

Wilderness

Since the proposed and alternative pipeline routes do not cross within the jurisdictional boundaries of any formally designated wilderness areas or wilderness study areas, there are no direct wilderness consequences anticipated. It should be noted, however, that impacts to the quality of the wilderness experience were addressed within both the visual resource and recreation sections of the study.

NOISE

Noise impacts were considered significant if they would be of a long-term nature and would cause people to be constantly exposed to levels over those normally found in a suburban environment, about 50-55 decibels. Especially sensitive receptors (e.g., hospitals, or schools) were not identified in proximity to the proposed action or alternatives.

LAND USES (OTHER)

Agriculture

Impacts to cropland were considered significant if construction, operation, and maintenance of the proposed pipeline(s) and pump stations would result in a concentrated long-term loss of crop production.

Since the pump station acreage requirements are relatively small and the pipeline rights-of-way would be reclaimed and generally returned to their preconstruction productivity levels within one year following construction, no significant long-term crop production losses would occur. For this reason, no further analysis will be conducted for this resource.

Prime Agriculture

Impacts to prime agricultural land were considered significant if any prime agricultural lands were taken out of production for the life of the project.

Long-term production loss on prime agricultural land could occur only if a pump station were located on prime agricultural land. Soil types present at proposed pump station locations were identified in the Soils task and then the Soil Conservation Service was contacted to determine whether the identified soils potentially qualify as prime agricultural land.

Livestock Grazing

Impacts to livestock grazing were considered significant if this action would result in a concentrated loss of production due to surface disturbance.

Livestock grazing capacity was expressed in terms of animal unit months (AUM) for uniform vegetation types. Calculation of the loss of grazing capacity, due to project activities, was based on acres removed within a 100-foot ROW and at permanent facilities such as pumping stations.

Forests

Impacts to forest resources were considered significant if this action would result in a loss of more than 1 percent of a regional forest resource (regional area defined by a 20-mile corridor centered on the proposed pipeline route). Because no significant commercial forest resources would be affected by the proposed project, no further analysis was conducted.

Minerals

Impacts were considered significant if the proposed pipeline and related facilities conflict with the use of mineral resources for which there are formal development plans.

SOCIAL AND ECONOMIC CONDITIONS

The type and level of analysis appropriate to assessment of potential social and economic impacts associated with the La Sal proposed action and alternatives was determined mainly by the characteristics of the affected environment, as well as by the characteristics of the project itself. The territory through which the proposed pipeline would pass has many frontier attributes, such as sparse population, a rural agrarian base, popular attitudes of strong independence, and a historical lack of economic diversity. Until recently, the rate of population growth has been slow, due largely to the high rate of outmigration, as young people left to seek jobs in other areas. Because of this, area residents have been receptive to growth and development,

which they hoped would stabilize local economies and community infrastructures (Murdock and Leistritz, 1979). Over the past decade, however, large-scale nonrenewable resource development projects have brought such rapid growth that they threaten to alter the social and economic features of the area dramatically and permanently.

Preliminary 1980 census data indicates that the town of Meeker, Colorado, grew approximately 28 percent between 1978 and 1980. Community population is expected to increase by an additional 24 percent by 1984 (CWACOG, 1980a). This qualifies it as a "boomtown" by most accepted standards (see, for example, Gilmore, 1976; Weisz, 1979; and Longbrake and Geyles, 1979). Many of the towns potentially affected by the La Sal project are in similar situations, attempting to accommodate rapid growth now, and anticipating even further accelerations of the growth rate over the next decade, as new massive coal and shale oil developments occur.

In many communities, facilities and services are stretched to capacity, and planners at all levels of government are working to prepare for the impacts of additional announced projects that could double the population of the four counties included in the Colorado West Area by 1985 (CWACOG, 1980a). Against this backdrop, it is evident that the needs of even a relatively small project can increase the severity of the existing problems. Incremental work-force and service demands, which ordinarily could be accommodated easily by a small stable town, might be impossible to deal with in a situation of rapid social and economic change, in which virtually no excess capacity exists in community facilities and services. Therefore, evaluation of the cumulative impacts of other proposed developments on social and economic systems in the study area becomes very important in the La Sal EIS.

The nature of the La Sal proposed action helped determine which social and economic issues warranted detailed analysis in the EIS, and which did not. Elements of the project description are discussed below with regard to how they delimit three aspects of potential impact: magnitude (what social and economic units are affected), duration (how long they are affected), and intensity (to what degree they are affected).

Magnitude

For the construction phase, the magnitude of potential project impacts was determined by three aspects of the proposed action:

- The 100 foot ROW would extend over approximately 3806 to 3878 acres of public and private land in six counties in northwestern Colorado and southcentral Wyoming.

- Nine communities are within easy commuting distance of the proposed action and are of sufficient size that they could be considered as potential sources of labor, supplies, and services.

- The proposed action passes within 5 miles of several communities.

From the above information, it is possible to define the social and economic units and some of the issues that were assessed for potential impacts. The analysis reviewed social and economic conditions in the six affected counties: Garfield, Rio Blanco, and Moffat, in Colorado; and Carbon, Sweetwater and Natrona, in Wyoming. The communities of Parachute, Rifle, Rangely, Meeker, Craig, Maybell, Baggs, Rawlins, and Casper were evaluated as potential sources of labor, supplies, and

services during the construction phase. The "nuisance factor" associated with construction activity within five miles of communities was also addressed.

The magnitude of potential impacts during the operation phase is limited by the size and location of the operation work force. The proposed operation work force would consist of 35 workers. Twenty-five of these would locate at Meeker, and the other ten would be scattered in various locations along the pipeline route. It is assumed that the impact of one or two families moving into any community near the pipeline route would be negligible, so that analysis of potential social and economic effects during operation will be limited to the town of Meeker.

Duration

Duration of impacts during the construction phase is determined by the speed of pipeline construction. The estimated average speed of pipeline construction is 0.8 miles per day in the rough terrain of northwestern Colorado, and 1.5 miles per day for the Wyoming section. Assuming six ten-hour work days per week, construction crews would move at an average rate of 4.8 miles per week through Colorado, and 9 miles per week through Wyoming. At this rate, it is likely that a construction crew would not be located in any one town for more than a few weeks. The pipeline would be built in four spreads, with construction times estimated as follows:

Spread No. 1 - Parachute Pump Station to Maybell - 4 months
Spread No. 2 - Piceance Creek to Rangely - 2.5 months
Spread No. 3 - Maybell to Ferris - 3 months
Spread No. 4 - Ferris to Casper - 3 months

Construction crews would work simultaneously. It is safe to assume that construction of the La Sal pipeline would commence and finish between June and November 1984. This allows ample time for accommodating schedule changes in critical wildlife areas, as well as for unforeseen problems with weather, terrain, etc.

Pipeline operation workers would live in the vicinity of the pipeline ROW for the life of the project, which could last 50 years or more. Their potential impact on the social and economic setting, however, will be limited to the time of their initial settling in the area. It is at that time that their incremental demands on community facilities and services would have to be accommodated.

Intensity

During the construction phase, the potential intensity of social and economic impacts is determined by the level of project and workforce needs that would have to be met locally. This in turn is determined largely by whether or not workers hired for the project are local or nonlocal. Locally hired workers would create almost no change in the existing social and economic structures, while nonlocal workers would bring with them new demands for temporary housing, transportation, food, recreation, and other social services. In this analysis, the "worst case" is assumed, i.e., that construction workers will be nonlocal.

As mentioned above, the La Sal pipeline would be built using four construction spreads. The two Colorado spreads would have approximately 100 workers, and the two Wyoming spreads would have approximately 132 workers. The intensity of impacts resulting from the presence of workers in any one town may be reduced, as workers tend to spread out along the route during construction. For example, workers responsible for clearing may move ahead of pipefitters and welders,

who may move ahead of reclamation workers. Consequently, crews may actually divide and seek accomodation in different towns. For the purposes of the EIS, the "worst case" will be assessed, i.e., it will be assumed that all nonlocal workers on a spread would seek facilities and services in the same towns at the same time.

The 35 operation workers would be specialized, skilled pipeline control center operators and maintenance personnel. Some may be trained locally, but most are likely to be nonlocal people, 25 of whom would settle in Meeker (with dependents, if any) in late 1985 or 1986. Their needs would be for a variey of local facilities and services, including housing, education, health care, recreation, etc. Their presence could influence local income levels and local business receipts, and could induce a small amount of indirect population growth. Their accommodation in Meeker could result in some costs to the county or school district for expansion of services and facilities. On the other hand, county revenues in all 6 affected counties would increase once the pipeline was in operation.

Social and economic issues identified as relevant for inclusion in the impact assessment, based on the characteristics of the setting and of the proposed action, are summarized in Table B-1. Data were collected and analyzed for these issues. Any potentially significant impacts identified are described in the EIS, to a level of detail reflective of the degree of potential significance. Data and analyses for those issues identified as relevant to the assessment, but for which no significant impacts were found, are filed at the BLM CSO.

For the purposes of impact assessment, certain "threshold" figures have been selected to determine whether or not a projected impact may be significant or not significant. These thresholds are

Table B-1. SUMMARY OF RELEVANT SOCIAL AND ECONOMIC ISSUES FOR DETAILED ANALYSIS IN BLM/LA SAL EIS

	Construction	Operation
COUNTY	• Employment demand • Transportation	• County revenues (all counties) • Infrastructure and service costs (Rio Blanco)
COMMUNITY	• Population effects, 1984 • Temporary worker housing and services (Parachute, Rifle, Meeker, Craig, Rangely, Maybell, Baggs, Rawlins, Casper) • Change in business receipts • Nuisance factors (Maybell, Rangely, Baggs, Casper)	• Population effects, 1985-86 (Meeker only) • Housing and other services (Meeker only)

not treated as sacrosanct, but are useful as conservative indicators of possible qualitative changes in the affected social and economic systems. Social and economic impacts associated with the proposed action and alternatives were considered potentially significant if they would bring about the following changes:

Construction

- Employment demand on the local work force greater than 15 percent

- Temporary change in local business receipts greater than 15 percent

- Demand for temporary housing and other community services that exceeds existing surplus capacities

- Increase in traffic that would have regional intercity roads operating beyond design capacities for Service Level C, or that would result in a measurable increase in accident rate per million vehicle miles traveled (i.e., ≥ 1)

- Nuisance factors that result in damage to human health, or loss of livelihood for which compensation is not made

Operation

- Permanent population change in Meeker greater than 10 percent

- Demand for permanent housing and for community services in excess of availability

- Change in county revenues greater than 10 percent

- Inability of Rio Blanco County and the town of Meeker to meet the costs of providing necessary facilities and services to new residents prior to receipt of project revenues

Unfortunately, there is no collection of empirical evidence in the social sciences to support and justify the universal use of particular threshold figures as failsafe. Attempts to quantify qualitative social change are admittedly inexact and value-laden. It is felt that a population growth rate threshold of ten percent for definition of significance in the EIS is reasonably conservative, given the range of figures currently in use by other analysts.

In this report, unless stated otherwise, "northwestern Colorado" refers to Garfield, Rio Blanco, and Moffat counties. "Southcentral Wyoming" refers to Carbon, Sweetwater, and Natrona counties. "Study region" refers to the six-county area.

LAND USE CONTROLS AND CONSTRAINTS

Federal, state, and local land use planning and management regulations and programs were examined for all land affected by the pipeline ROW. Impacts were considered significant if the proposed action or alternatives would conflict with these regulations and programs.

ACEC - Area of Critical Environmental Concern. Refers to areas within public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural or scenic values; fish and wildlife resources; or other natural systems or processes; or to protect life and safety from natural hazards.

ACRE FOOT - the volume (as of water) that would cover 1 acre to a depth of 1 foot.

ANCILLARY FACILITIES - those structures (pump stations, power and communications lines, cathodic protection systems) that are necessary for the continuous operation or maintenance of the pipeline.

ANGLE OF OBSERVATION - the vertical angle between a viewer's line of sight and the slope or object being viewed.

AUTHORIZED OFFICER - an employee of the BLM who has been delegated the duties and responsibilities for issuance, modification, protests, suspension, renewal and termination actions associated with the right-of-way and related facility permits proposed in this document.

BARRELS PER DAY (BPD) - a unit measuring the rate at which petroleum is produced, transported or consumed. (Barrel is a unit of volume measure equal to 42 U.S. gallons).

BLANKETED - covering an area to be blasted with heavy mats to reduce the extent of flying debris from the blasting.

BORROW DITCH - excavation alongside a roadway. The material excavated is used to construct the roadway embankment. These ditches are also used to carry water which drains from the road surface.

BTU - British thermal unit. The amount of heat needed to raise the temperature of one pound of water one degree farenheit; equal to approximately 252 calories.

CHECK VALVE - a valve with a free-swinging tongue or clapper that permits liquid to flow in one direction only, as in a pipeline.

COATING - a field operation for preparing a pipeline to be lowered into the ditch. The line is coated with an inert material, then spiral wrapped with a tough, inert wrapper. Machines ride the pipe, and coat and wrap in one continuous operation. This process protects the pipeline from corrosion. For some pipeline jobs the pipe may be coated and wrapped at a mill or construction yard site. Any damage to the coating from transportation or handling can be corrected before the pipe is installed.

COMMON CARRIER - a transporter of commodities for hire to the public and regulated by some agency of the government.

COMPACTION - the process by which soil grains are rearranged to decrease void space, thereby increasing the weight of solid material per cubic foot.

CONTRAST - the difference between adjacent parts in color and form, as used in BLM VRM System.

CROWN - center of a roadway elevated above the sides.

CRITICAL HABITAT - any air, land, or water area--including any elements thereof--that the Secretary of the Interior or the Secretary of Commerce has determined (and has announced in the Federal Register) to be essential to the survival of wild populations of a Threatened or Endangered Species or to be necessary for their recovery to a point at which the measures provided pursuant to the ESA are no longer necessary. Constituent elements of Critical Habitat may include, but are not necessarily limited to, land, air, and water areas; physical structure and topography; flora, fauna, and climate; and the quality and chemical content of soil, water, and air. (The words "Critical Habitat" must always be capitalized when referring to officially determined Critical Habitat, pursuant to Section 7 of the ESA.)

CRUCIAL HABITAT - portion of the habitat of sensitive species that, if destroyed or adversely modified, could result in their being listed as threatened or endangered pursuant to Section 4 of the ESA, or in some category implying endangerment by a state agency or legislature. Examples of crucial habitat areas are booming grounds, nesting areas, brood rearing areas, winter ranges, migration routes, anadromous fish spawning grounds, fish rearing waters, or any habitat necessary to the survival of the species in question at important periods of their life cycles.

CUT-AND-FILL - process of earth moving by excavating part of an area and using the excavated material for adjacent embankments or fill areas.

DITCH - a small artificial channel cut through earth or rock.

DIVERSION DAM - a barrier built across a stream to divert all or some of the water from or around existing water courses.

EASEMENT - an interest in land owned by another that entitles its holder to a specific limited use.

FORM - the mass or shape of an objective or objects that appears unified, such as in the shape of the land surface, as used in BLM VRM System.

GATE VALVE - a valve with a solid gate closing element that fits tightly over an opening through which petroleum products pass in a pipeline; can be shut off to prevent flow.

GRADE - degree of slope of a road, channel, or natural ground.

GRANT (see RIGHT-OF-WAY GRANT) - a document authorizing non-possesive, non-exclusive right to use federal land for a limited purpose.

HAZARDOUS CONDITION - a situation in a pipeline system during which there is an unintentional release of product from the system that would be hazardous to life or property.

HAZARDOUS MILE-HOUR - the risk exposure where products escape from the pipeline causing hazardous conditions on one mile of pipeline for a duration of one hour.

HYDROSTATIC TESTING - filling a pipeline or tank with water under pressure to test for tensile strength; its ability to hold pressure without rupturing.

LEAK SECTION - a section of pipeline containing a leak, which is isolated between two gate valves.

LINE - the path, real or imagined, that the eye follows when perceiving abrupt differences in form, color, or texture. Within the landscape, lines may be found as ridges, skylines, structures, changes in vegetative types or individual trees and branches, as used in BLM VRM System.

MICROWAVE - an electromagnetic wave with a length between about 0.3 and 30 centimeters, corresponding to frequencies of 1-100 gigaherz; however, there are no sharp boundaries distinguishing microwaves from infrared and radio waves.

NATURAL SAG - natural axial elastic deformation of unsupported pipe because of gravity.

PIPELINE MILE-HOUR - the risk exposure on one mile of pipeline for a duration of one hour.

RAW SHALE OIL - The oil produced by thermal decomposition of organic matter (kerogen) present in naturally occuring oil shale; dominantly a complex mixture of saturated and unsaturated hydrocarbons, sulphur-containing and nitrogen-containing organic compounds.

RECTIFIER - a nonlinear circuit component that allows more current to flow in one direction than the other; ideally, it allows current to flow in one direction unimpeded but allows no current to flow in the other direction.

RIGHT-OF-WAY (ROW) - the Federal land authorized to be occupied by La Sal pipeline project pursuant to a ROW grant.

RIGHT-OF-WAY GRANT - a document authorizing a non-possessory non-exclusive right to use Federal lands for the limited purpose of construction, operation, maintenance, and termination of the pipeline.

RIPPER TOOTH - a stout steel tooth-shaped implement inserted into the ground and pulled by a tractor to break up hard ground or soft rock prior to ditch excavation.

RIPRAP - non-weathering or slow-weathering material placed on a stream bank and bed for protection from stream or wave action; can consist of broken rock or other materials.

SCENIC QUALITY - the degree of variety within a landscape, measured as distinctive, common, or minimal. The measurement of scenic quality is based on the premise that landscapes with the most variety or diversity have the greatest potential for high scenic value, as used in BLM VRM System.

SCOUR ACTION - to abrade and wear away; used to describe the wearing away of terrace or diversion channels or stream beds.

SCRAPER TRAP - a facility on a pipeline for inserting and retrieving a scraper or "pig." The trap is essentially a "breech-loading" tube isolated from the pipeline by valves. The scraper is loaded into the tube like a shell into a shotgun. A hinged plug is closed behind it, and line pressure is then admitted to the tube behind the scraper. A valve is opened ahead of the scraper and it is pushed into the line and moved along by the liquids.

SEEN-AREA - the perspective of the visual resource is within clear viewing distance of public use areas (roadways, recreation sites).

SHALE OIL - Any oil produced from shale. The unqualified term "shale oil" is sometimes used in technical literature to describe either raw shale oil or upgraded shale oil. The term shale oil as used in this document generally refers to upgraded shale oil.

SPUR - a short pipeline for connecting a plant to a main pipeline.

STOPPLES - a specialized plugging apparatus inserted into a pipeline for temporary stoppage of flow.

SURFACE MANAGEMENT AGENCIES - the Bureau of Land Management, National Park Service, Water and Power Resource Service, U.S. Fish and Wildlife Service, and state land agencies.

TAMP - compaction of loose soil into a firmer state by dynamic means.

TELEMETERING - transmitting the readings of instruments to a remote location by means of wires, radio waves, or other means; also known as remote metering or telemetry.

TERRACING - constructing a ridge across a slope to minimize erosion by directing water flow across the slope rather than allowing water to accumulate down the slope.

TOPSOIL - surface soil, usually corresponding with the A horizon, as distinguished from subsoil.

TWO-TONING - a pipeline construction technique used on steep slide slopes whereby grading is done at two levels or steps; the upper level used for excavating and installation, and the lower level used for vehicle passage.

UPGRADED SHALE OIL - The semi-refined oil, substantially equivalent to petroleum crude oil, produced by hydrogeneration and/or other processing such as de-arsenation and coking of raw shale oil. Upgraded shale oil is generally suitable as a feed stock for conventional refineries.

VRM (VISUAL RESOURCE MANAGEMENT) - the planning, design, and implementation of BLM management objectives to provide acceptable levels of visual impacts for all BLM resource management activities. VRM Classes are based on visual quality characteristics, sensitivity, and viewing distance criteria.

1. Class 1. This class provides primarily for natural ecological changes; however, it does not preclude very limited management activity. Any contrast created within the characteristic environment must not attract attention. It is applied to wilderness areas, some natural areas, wild portions of the Wild and Scenic Rivers, and other similar situations where management activities are to be restricted.

2. Class II. Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape. A contrast may be seen but should not attract attention.

3. Class III. Contrasts to the basic elements (form, line, color, texture) caused by a management activity may be evident and begin to attract attention in the characteristic landscape. However, the changes should remain subordinate to the existing characteristic landscape.

4. Class IV. Contrasts may attract attention and be a dominant feature of the landscape in terms of scale; however, the change should repeat the basic elements (form, line, color, texture) inherent in the characteristic landscape.

5. Class V. Change is needed or change may add acceptable visual variety to an area. This class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding landscape. This class would apply to areas identified in the scenic evaluation where the quality class has been reduced because of unacceptable cultural modification. The contrast is inharmonious with the characteristic landscape. It may also be applied to areas that have the potential for enhancement, i.e., add acceptable visual variety to an area/site. It should be considered an interim or short-term classification until one of the other VRM class objectives can be reached through rehabilitation or enhancement. The desired Visual Resource Managment class should be identified.

VISUAL SENSITIVITY - a measure of viewer interest in the scenic qualities of the landscape, as used in BLM VRM System.

WALKED-IN - compaction of backfill in a ditch by the tread of the wheel of a vehicle moving down the ditch line or by the track of a tractor. The weight of the vehicle furnishes the dynamics for compaction.

WATER BARS - earthen dikes, generally a foot in height, built to divert surface water.

WATER EROSION HAZARD - relative susceptibility of a soil to water-induced erosion. In this report, based on Soil Conservation Service K factors where: $<.2$ = low; .2 -.39 = moderate; and $\geq.4$ = high.

WELDING - joining two metals by applying heat to melt and fuse them.

WIND EROSION HAZARD - relative susceptibility of a soil to wind-induced erosion. In this report, based on Soil Conservation Service WEG classes where: Classes 5-8 = low; 3-4L = moderate; and 1-2 = high.

APPENDIX D
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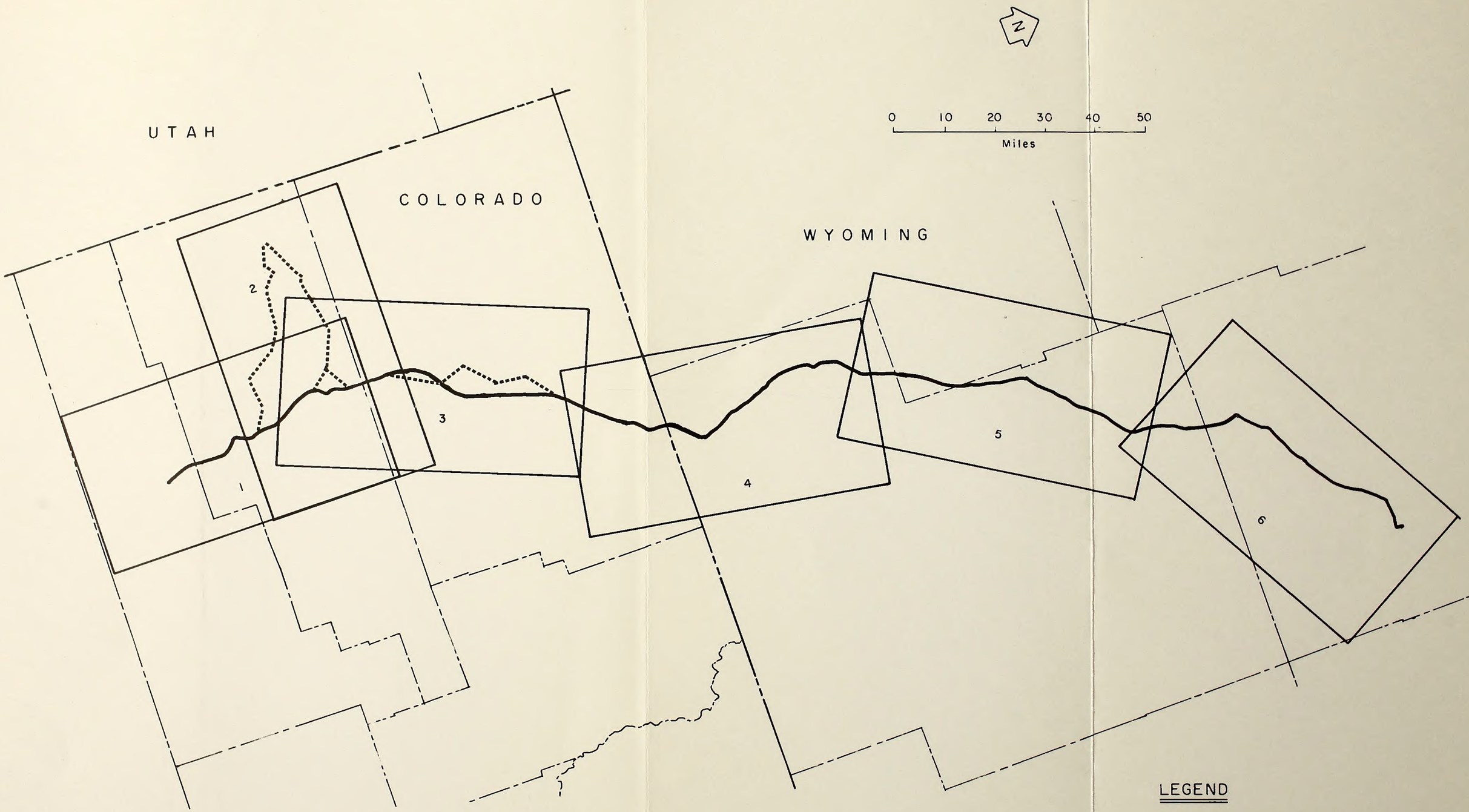
APPENDIX E
INDEX



LEGEND

Proposed Action

Alternatives

APPENDIX "F"

Index For Maps 1-6 of La Sal Proposed Shale Oil Pipeline And Alternatives

T5S T4S T3S T2S T1S T1N T2N T3N

R 98 W R 97 W R 96 W R 95 W R 94 W

SOUTHERN RANGELY LATERAL ALTERNATIVE

NORTHERN RANGELY LATERAL ALTERNATIVE

WHITE RIVER ALTERNATIVE

PROPOSED PARACHUTE STATION

A B C D E F

BLM PRI STL

AB 0 AB 10 AB 20

CEF 0 CEF 10 CEF 16

DEB 0 DEB 10

0 10 20 30 40

Grand Hogback

Note: 1) Tracts less than 40 acres are usually amitted because of the map scale.

LEGEND

Status of Proposed ROW:

- Not Near Other Pipeline
- Near Other Pipeline
- Alternate Route

BLM.....Public Land
STL.....State Land
PRI .....Private Land

- Boundary of Ownership
- Milepost
- Pump Station
- Future Pump Station
- Pump Station Alternative
- —P— Power
- —C— Communications

N

0 2 4 6
Miles

Map 1 of 6

R103W R102W R101W R100W R99W R98W R97W R96W R95W R94W

T4N T3N T2N T1N T1S

NORTHERN RANGELY LATERAL ALTERNATIVE

WHITE RIVER ALTERNATIVE

SOUTHERN RANGELY LATERAL ALTERNATIVE

A B C D E F G

LEGEND

Status of Proposed ROW:

- Not Near Other Pipeline
- Near Other Pipeline
- Alternate Route

BLM.....Public Land
STL.....State Land
PRI .....Private Land

Boundary of Ownership
Milepost
Pump Station
Future Pump Station
Pump Station Alternative

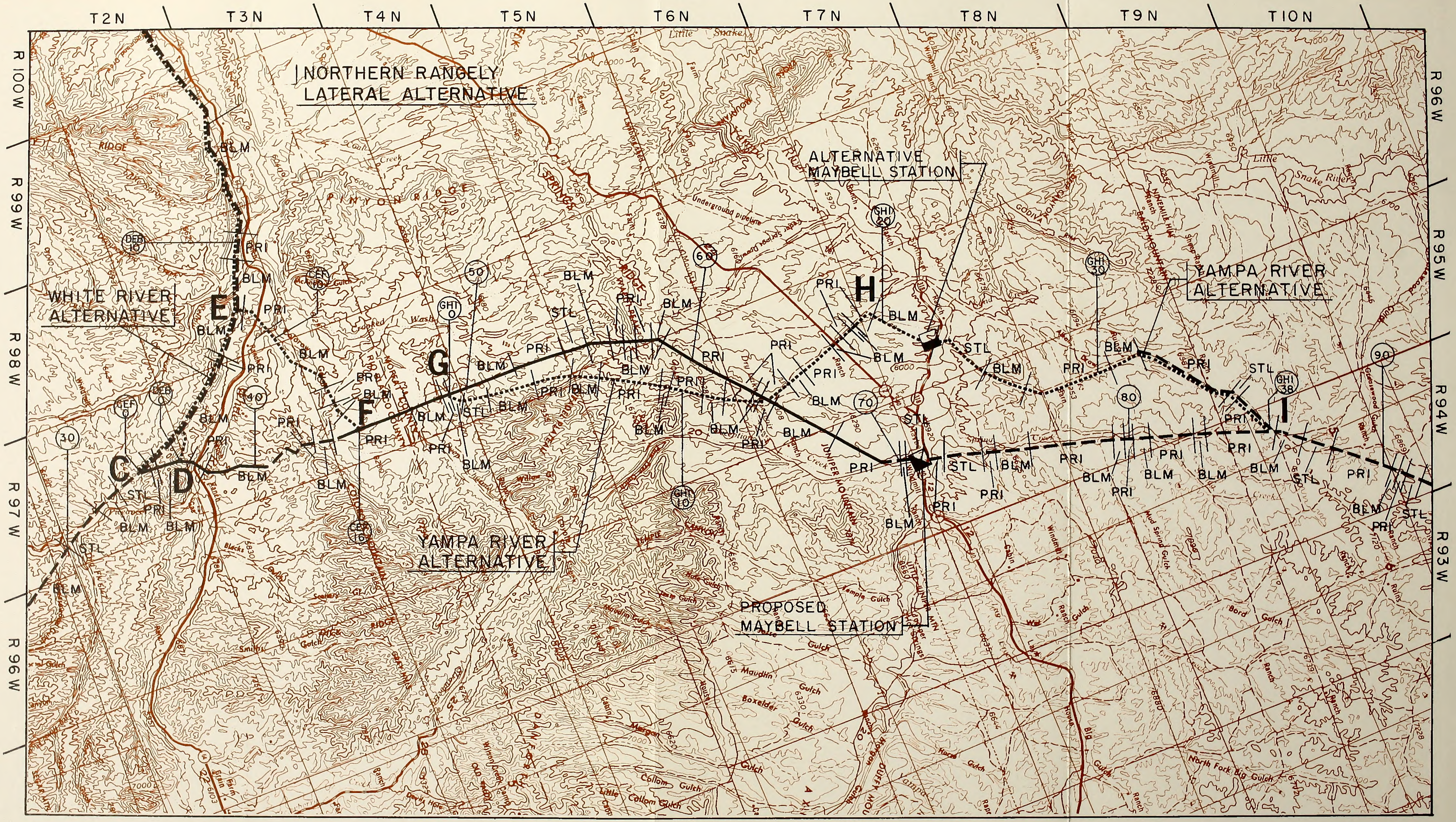
—P— Power
—C— Communications

Note: 1) Tracts less than 40 acres are usually omitted because of the map scale.

N

0 2 4 6
Miles

Map 2 of 6



LEGEND

Status of Proposed ROW:

- Not Near Other Pipeline
- Near Other Pipeline
- Alternate Route

BLM......Public Land
STL......State Land
PRI ......Private Land

Boundary of Ownership
Milepost
Pump Station
Future Pump Station
Pump Station Alternative

—P— Power
—C— Communications

Note: 1) Tracts less than 40 acres are usually omitted because of the map scale.

0 2 4 6
Miles

Map 3 of 6

T10N T11N T12N T13N T14N T15N T16N T17N T18N

R94W R93W R92W R91W R90W

90 100 110 120 130 140 150

PROPOSED BAGGS STATION

SWEETWATER COUNTY
CARBON COUNTY

WYOMING

PRI BLM STL

LEGEND

Status of Proposed ROW:

- Not Near Other Pipeline
- Near Other Pipeline
- Alternate Route

BLM.....Public Land
STL.....State Land
PRI .....Private Land

Boundary of Ownership
Milepost
Pump Station
Future Pump Station
Pump Station Alternative

—P— Power
—C— Communications

Note: 1) Tracts less than 40 acres are usually omitted because of the map scale.

N

0 2 4 6
Miles

T21N T22N T23N T24N T25N T26N T27N T28N

R 92W R 91W R 90W R 88W R 87W R 86W R 85W

PROPOSED RAWLINS STATION

LEGEND

Status of Proposed ROW:

- Not Near Other Pipeline
- Near Other Pipeline
- Alternate Route

BLM.....Public Land
STL.....State Land
PRI .....Private Land

- Boundary of Ownership
- Milepost
- Pump Station
- Future Pump Station
- Pump Station Alternative
- —P— Power
- —C— Communications

Note: 1) Tracts less than 40 acres are usually amitted because of the map scale.

N

0 2 4 6 Miles

LEGEND

Status of Proposed ROW:

- Not Near Other Pipeline
- Near Other Pipeline
- Alternate Route

BLM.....Public Land
STL.....State Land
PRI .....Private Land

- Boundary of Ownership
- Milepost
- Pump Station
- Future Pump Station
- Pump Station Alternative
- —P— Power
- —C— Communications

Note: 1) Tracts less than 40 acres are usually amitted because of the map scale.

N

0 2 4 6
Miles

Map 6 of 6

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(June 1984)

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DATE LOANED	BORROWER	C

USDI – BLM

Form 1542–6
(May 1978)

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